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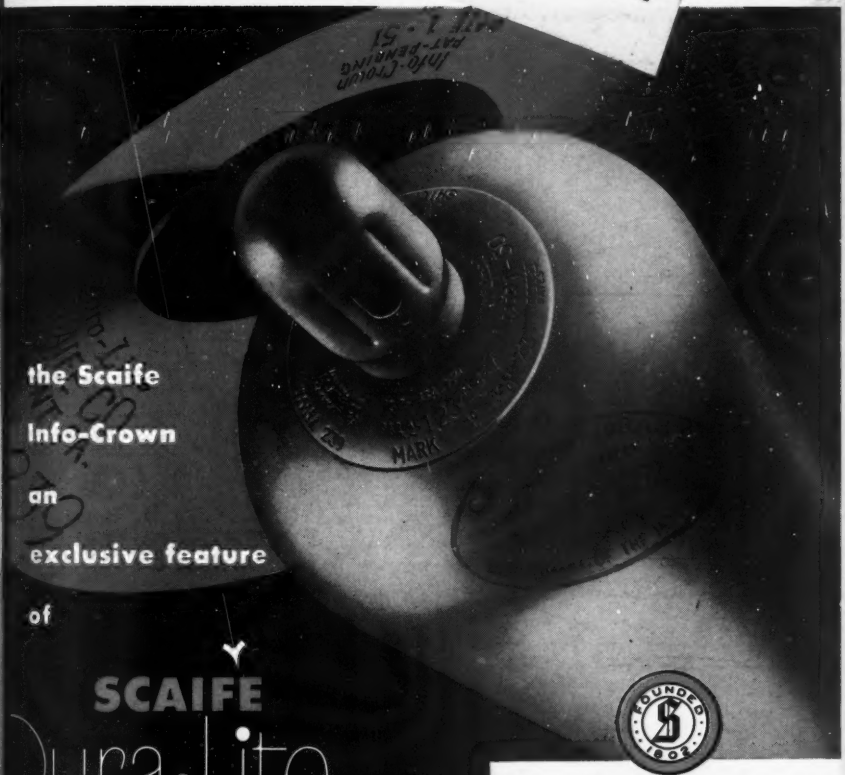

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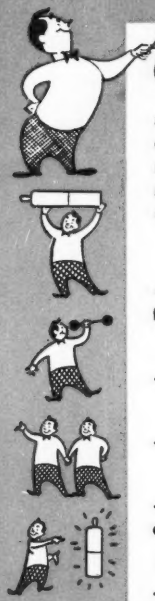

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VOLUME 14 • NUMBER 9

A JENKINS PUBLICATIO

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Los Angeles (4)—198 So. Alvarado
Phone DUnkirk 7-4337

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BUTANE-PROPANE News is publish monthly. Copyright 1952 by Jenki Publications, Inc., at 198 So. Alvara St., Los Angeles 4, California. Subscr tion price: United States and U. Possessions, Canada, and countries Pan-American Postal Union (in advanc 50c per copy, one year $2; two ye $3. All other countries one year $ two years $7. Entered as second-cl matter May 29, 1939, at the post of at Los Angeles, California, under Act of March 8, 1879. Member of Au Bureau of Circulation, Controlled Cir lation Audit, Liquefied Petroleum G Assn., National Butane-Propane Assn.

Publishers: GAS, The Magazine of Gas Utility industry; HANDBOOK TANE-PROPANE GASES; THE BOTTL GAS MANUAL; BUTANE-PROPA POWER MANUAL; Annual BUTA PROPANE News CATALOG; B-P Ne BULK PLANT DIRECTORY; WESTE METALS.

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HEADQUARTERS FOR LP-GAS INFORMATION SINCE 1931

TEXAS

We noticed the article on alfalfa flaming developed by Lancaster Gas Co., Lancaster, Calif., that appeared in your April, 1952 issue.

Please advise if you have developed any further information on this operation, particularly with regard to the benefits being received by the growers in that area.

V.A.McC.

We are advised that the alfalfa flaming which we covered in our article "Alfalfa Flaming Is A Load Builder" (April 1952 issue, p. 43) has been highly successful in the control of insects and weeds.

Most farmers report their first cutting graded higher than similar hay from untreated fields, and in most cases the cost of flaming was more than paid by the higher price received for this first cutting.

Additional work has been done on attempting to control sandburrs by flaming, following the second cutting. The results of this work are not yet conclusive. All of our alfalfa fields are irrigated, and it is noticeable that following the flaming the water spreads more rapidly, giving better uniformity of penetration and reducing the amount of water required to cover the field.—Ed.

•

CALIFORNIA

I have a 1952 Ford with automatic transmission which runs on L. P. fuel. I would like to increase the compression ratio by putting on high compression heads or plane the present heads.

Which would you recommend? If you recommend the high compression heads what make and ratio would you suggest?

J.P.W.

A converted Ford runs considerably better on propane if the compression is raised. The Ford Motor Co. advises that planing .060 of an inch off the V-8 Ford heads increases the compression ratio to 7.75:1.

There are a number of manufacturers of hot rod specialties who manufacture heads with considerably higher compression ratios. We regard these ratios as rather extreme if the engine is to be operated periodically on gasoline, but if propane is to be used continuously, the ratios are quite satisfactory up to 8.5:1.

You will also make considerable improvement by blocking off the exhaust heat channel through the hot box in the manifold. This may be done quite easily by driving small metal discs similar to pennies into the openings.—Ed.

•

MISSOURI

There is a florist in our town now using an oil stove with a fan to heat a small greenhouse. The firm specializes in cut flowers but also does some

growing in its commercial greenhouse.

I have recommended the use of a suspended gas ceiling unit but the deal cannot be made until I have obtained information regarding the merits of the two fuels in regard to any harm that might result to the growing plants.

Our florist has heard that the gas will dry the air to the point that it will injure the plants. If this is true, what can be done to overcome this trouble?

M.P.R.

The products of combustion by burning natural gas, propane, and butane contain a greater percentage of water vapor than those produced by the combustion of oil. Therefore, it seems the argument that gas will dry the air is without foundation.

The combustion products when burning gas are the same as those produced when burning oil. They vary a little in the relative proportions, about 2 to 4% in roughly 14%. Oil flames may produce some sulphur dioxide gas, which, in general, the gas will not.—Ed.

•

ALBERTA

I was greatly interested by the article in your December issue on "LPG in Paradise" and note that in several installations of Pacific Refiners the tanks appear to be painted in a dark color.

I wonder if they or any of your other readers have any comments to make on the effect of vaporization through different color painting. It is a pretty well established fact that aluminum best reflects the sun's rays, and no doubt that is the reason why it has become pretty well standard in climates such as California—the cradle of the LPG industry, where the cooling effect is desirable. One would think, that in a semi-tropical climate like Hawaii this would be almost adamant.

Have we Northern operators merely inherited this practice? It has often occurred to the writer, that here in northern Alberta, where for about 11 months of the year we want all the heat we can get, that some heat-absorbing paint might be well worth experimentation. I would be very glad to have any qualified comment on this subject.

R.H.

Apparently the use of aluminum paint on L. P. gas storage vessels stemmed from (1) the belief it helped reduce high tank pressure in hot, sunny climates because it reflects better than the darker colors; (2) it could be easily applied to produce a satisfactory finish which withstood the weather; and (3) it is usually less expensive in first cost.

In recent years, some companies have broken away from the aluminum paint and have selected distinctive colors for their tanks and equipment. Even here, in southern California, one large dealer uses a distinctive dark green.

It has been found, too, that an enamel paint with a high gloss surface may have good reflecting qualities regardless of color. It must be remembered that a surface which reflects heat from entering the tank will also, in most cases, reflect heat back into the tank with about equal effect when the outside temperature falls below that inside the tank. Likewise, a flat finish, dark paint which may have good heat-absorbing qualities will, by the same token, radiate heat from the vessel contents to the atmosphere quite rapidly when the outside temperature is low. The net gain in vaporization of a heat-absorbing paint over one which has high reflecting qualities may be very little in a 24-hour period.

Actually, we do not know of any authoritative data on the effects of paint colors on the vaporizing of liquefied petroleum gas in storage vessels. Paint quality and pigments have varying effects. Perhaps some of our readers have something to report on this subject. Also, why not experiment a little on your own?

The tanks used for customer service by Pacific Refiners, Ltd., Honolulu, and

shown in the pictures which accompany the article "LPG in Paradise," are actually dark green in color. There are two reasons for this. First, the color blends with the foliage of the islands and, second, straight normal butane is the fuel distributed, so it seemed advisable to use the dark color for the heat-absorbing qualities that it might have.—Ed.

•

MISSOURI

We have purchased a new Chevrolet truck for a propane delivery tank truck and would like to know how much to plane the head to convert to propane gas. The motor is the 105 hp Roadmaster.

Can the same valves be used and do we need a different plug?

How much torque should be put on the head bolts after planing?

With the planing and blocking of the manifold, about how much will the horsepower be?

C.G.A.

As explained in our BUTANE-PROPANE *Power Manual*, there is not a great deal to be gained by raising the compression of a Chevrolet engine without going into considerable additional alterations.

Cutting the head 1/16-in. is all that is recommended, unless you wish to replace the present head with one which is equipped with combustion chamber inserts and enlarged valves and valve ports. This will in turn require a special L. P. gas manifold of larger diameter than the standard manifold. These two units should be used in combination, as neither is effective without the other.

The modified head will take spark plugs which are one or two head ranges colder than the standard plugs. In bolting down the head, the wrench torque should be the same as with the standard head, making sure first that the threads are properly cleaned and that they extend far enough down the studs to permit the nuts to be tightened freely.

All of these subjects are covered quite completely in our *Power Manual*, and we would suggest that if you do not have a copy, it would be worth your while to purchase one before converting the engine.—Ed.

•

MILANO, ITALY

When you have an L. P. gas filling station (storage tank and dispensing units) how do you operate the charging of the bottle which is brought in by the customer? In other words, how do charging station operators act in the U. S. to charge the bottle? Do they have scales to determine the weight of the bottle or do they have some special valves, like the RegO No. 3103 C4, equipped with fixed liquid level gauge, on the bottle?

I would be glad to have your experienced opinion, because the problem I am facing is a quite important one.

Further to that, do they commonly use bottle or cylinder valve with relief valves in the U. S.?

Dr. I.A.B.

Bottles or cylinders are filled with L. P. gas by weight or by metering and filling to the fixed liquid level (outage gauge) in the U. S.

Many stations, where truck and automobile L. P. gas tanks are filled, use liquid meters. They also fill portable bottles at these stations.

However, unless a bottle is fitted with a maximum fill, liquid level gauge such as the RegO No. 3103-C4 or an equivalent it should not be filled except by weighing, since there is no other way of determining how much liquid is in it.

A large portion of the cylinder valves in this country are equipped with relief valves, and there is a tendency to use them more and more. Cylinder valves for vapor withdrawal are the only ones which may be used with built-in relief valves, since the relief valve must connect to the top of the vapor space.—Ed.

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THIS is a special issue of BUTANE-PROPANE *News* — covering the Farm, Industrial and Power Markets —and it has the over-all objective of trying to help dealers build new and greater business through citing and explaning numerous uses of liquefied petroleum gas.

Innumerable operations and kinds of equipment are described and valuable sales and background information are presented in a segregated, methodical manner to enable the dealer to fortify himself with the needed facts to make creditable sales approaches to prospective customers. This information includes explanations of what the various pieces of equipment do, where and how used, and the size of the market.

•

Without question the greatest potential for sales of propane lies on the farms of the nation. There the domestic load will always be attractive, but in addition are the equipment and fuel which can aid the farmer in producing better crops faster. This he can do with LPG-powered machines which will enable him to more effectively and economically plant, plow, cultivate, irrigate, and dry his crops; control weed and pest growth; produce better milk and livestock; obtain higher efficiency in poultry raising; and get the products of his labor to an earlier market. Incidentally, to better balance the fuel load.

•

There are possible many sales of small industrial equipment, like torches, to the farmer, too, and larger opportunities exist in the foundries, kilns, metal working plants, and small shops of the towns throughout the country.

Always there are sawmills or road work or gravel pits, or tractors and trucks where engines can be converted from gasoline to propane—a huge field of activity and possible profit to the dealer looking for new avenues of activity and who will take the trouble to learn basic facts about individual operations.

•

That's why this issue of BUTANE-PROPANE *News* is being printed. Read it thoroughly, keep it before you for frequent reference, and capitalize upon the opportunities it presents for enlarged sales volume.

•

It's fine to keep your sales sights high, but don't forget that *safety* is always the industry's No. 1 goal!

By Ed.

do a better job—easier
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METALBESTOS DIVISION
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TWO major developments in Washington in recent weeks are now offering a good deal of relief to LPG dealers in their sale of fuel and appliances.

Higher prices for liquefied petroleum gas have been given the green light by the OPS, which has okayed increases in ceiling prices of LPG. The effect of the new regulation is to permit resellers to pass on increased product and transportation costs which have risen steadily since the general price freeze of Jan. 26, 1951.

Prices of resellers of LPG have tended to remain stable over long periods of time. Thus their freeze prices have not reflected increases made by refiners and primary distributors during the fall of 1950. In addition, freight rate hikes during 1951 and currently have further reduced their gross margins.

Installment credit buying also received a spurt from the recent Federal Reserve Board decision suspending controls on Regulation W. The lifting of the credit restrictions now will give dealers a much needed chance to go out and really promote appliance sales. For the consumer this means no government requirements as to down payments or time to pay for ranges, dryers, washing machines and scores of other items normally on time-purchases. In 1950, one-half of the $29 billion spent on consumer durable goods was financed by installment credit.

Dealers can now open up on credit terms or keep on the same terms they have had. Perhaps the most cautious procedure would be a compromise of the latter, although a local competitive situation will most likely determine the credit terms the dealer will offer. For his own protection, however, a satisfactory down payment or short term payment period may be the wisest policy to pursue.

In any event, the way is now wide poen for greater appliance promotion among LPG dealers leading to the installation of more gas appliances into American homes.

•

We recently received a nice little folder designed to increase the sale of LPG for motor fuel, put out by Midwest Skelgas Co., Lusk, Wyo. Good folder! Tucked down in the bottom corner was a short paragraph which contains a mighty idea. We don't think it was given prominence enough.

Listen to this: "Propane and butane can also be used for heating your home, heating water, chicken brooding, refrigeration and cooking on your farm. The savings that you realize by using propane as a motor fuel may contribute a large share in paying for these conveniences in your home and around your farm."

Do you know any better way to get papa to convert his tractor than to

have mama breathing down his neck to save money on his tractor fuel so she can have a new refrigerator? And what looks the biggest to papa? —saving 5 or 6c a gallon on his tractor fuel, or saving enough to buy a refrigerator for mama?

•

The Prairie Farmer, Chicago, recently ran a survey in which Future Farmers of America were asked, "Which do you think is the tractor fuel of the future?" Of the 573 who answered the question, 285 voted for diesel, a significant 225 for L.P. gas, and 63 for gasoline. Asked what fuel their farms were now using, 499 reported gasoline, 32 diesel fuel, and only 6 L.P. gas. Could too many of our dealers be waiting for the boys to grow up?

•

Tom Gorman, butane-propane carburetion equipment distributor of Tulsa, Okla., reports that since new tractors with factory installed LPG fuel systems are becoming plentiful, the rate of conversion of old gasoline tractors in his area has slowed down. The reason? The propane system costs about the same, whether it is added to an old tractor worth $500, or bought as part of a new tractor costing $3000. Some tractor dealers are selling as high as 65% of their new tractors with LPG carburetion.

He also reports, and this tallies with information received from other parts of the country, that used tractors equipped with popular propane conversions sell faster, and for better prices, than those with the original gasoline equipment.

Let's put those two conditions together, and see what they add up to. The demand for LPG tractors is increasing, and it is just as potent in the used tractor market as in new tractor sales. Most of the tractors now being traded in are equipped to burn gasoline. With a growing demand for propane-burning used tractors, and a diminishing supply, plus an oversupply of gasoline-burning used tractors building up, who is the logical conversion prospect? Obviously, the tractor dealer.

He will also eventually carry the burden of servicing the fuel systems on the tractors that he sells, whether they be new or used. Most propane dealers will like this, because at that time they will unload their carburetion problems on the tractor dealers, at the same time supplying an increasing amount of load-balancing summer tractor fuel. But let's not die on the vine. Someone must still sell the tractor dealers on the idea they should start converting used tractors in preparation for resale.

•

Quoted from pamphlet on "Infrared Brooding," prepared by the West Virginia Farm Electrification Council and the Virginia Farm Electrification Council: "Loss of light and heat due to power outages may cause the chicks to pile up and smother or chill; however, actual experiences of users indicate that this is not a serious problem where good management is used by the poultryman." And on another page, telling what to do if the power goes off: "It is desirable to have emergency heaters for broods of 1,000 or more chicks."

From the above we assume that "good management" includes providing a reliable means of supplying emergency heat. We could suggest a very reliable source of brooder heat —L. P. gas—which could be used all the time without any need for a stand-by source of emergency heat.

Carl Abell

This is the second annual issue of BUTANE-PROPANE *News devoted to applications of liquefied petroleum gas on the farm, and in the industrial and power fields.*

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Farm, Industrial and Power Market Issue

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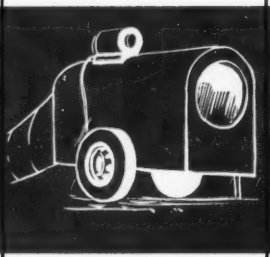
1 THE FARM MARKET



Farm Power

Tractors
Combines
Special crop harvesters
Forage chopping
Pumping
Spray rigs
Stationary engines
Crop dryer blowers
Cotton pickers

Drying and Dehydration

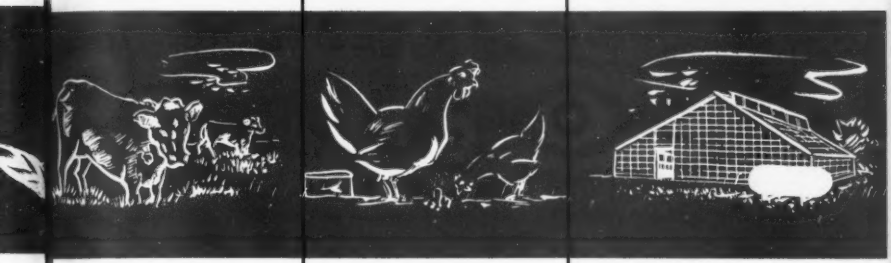
Forage crops (grass)
Alfalfa
Corn
Rice
Small grains
Soy beans
Seed crops
Tobacco
Cotton
Fruit
Nuts
Peanuts
Sweet potatoes

Burning

Flame cultivation
Insect control in
Alfalfa
Strawberries
Onions
Weed clearing in
Fencerows
Roadways
Ditches
Canals
De-Spining cactus

• *Guide to Farm Applications*

53 Agricultural Activities Using Liquefied Petroleum Gas Make the Farmer a Good Prospect to Cultivate. (The following pages describe products and methods.)



Dairy and Livestock

Water heating
Sterilization
Pasteurizing
Refrigeration
Stockwater heating
Shelter heating
Barn heating
Branding
Transporting
Hog singeing

Poultry

Brooding
Incubation
Insect control
Disinfecting
Scalding
Singeing
Heating

Miscellaneous

Greenhouse heating
Meat smoking
Orchard heating
Produce heaters

1

The Farm Market

The Dealer's Biggest Potential: Fuel Sales on the Farm

THE farm market is a changing picture, but the changes are improving the outlook for the L. P. gas industry. In any one year, not a great deal of difference can be seen, but the long range view over a number of years shows the trends clearly, establishes the perspective, and points the way for the future.

In 1870, about 50% of the population of the United States obtained a living from agriculture, whereas in 1950, only about 17% did so. In 1870, the work of one family on a farm was required to produce enough surplus crops to supply one family off the farm. Today, one farm family supplies the needs of six families located somewhere else. But that is not the whole story. The supply for every family is more abundant, and in addition our farms have added tremendous production of materials for industries which were not born in 1870—or even in 1900.

The substitution of mechanical horsepower for the labor of men and animals has made this great change possible. This mechanization of agriculture is still going on. Since 1935, the number of people engaged in agriculture has steadily decreased, and the number of farms has been reduced by 22%. Fewer people, using more horsepower on larger farms, are producing greater crops.

The increasing productivity, and income, of farmers have brought a rising standard of living, of which the comforts and convenience of L. P. gas are an essential part. This rising standard of rural living has brought our industry most of its business, and has at the same time been a direct cause of our greatest industry problem—the seasonal unbalance of consumption between winter and summer.

Paradoxically the mechanization on which this standard of living is based gives us our greatest opportunity to solve this industry problem.

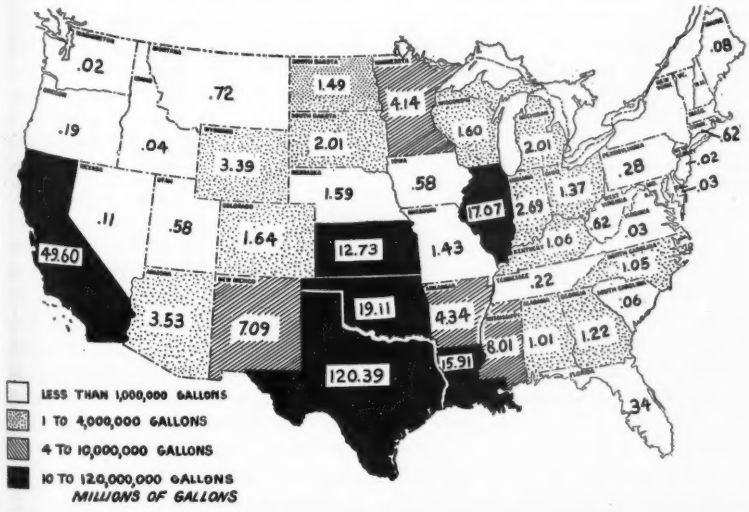
Tremendous quantities of fuel other than butane-propane are used in the mechanized and industrial type operations on farms, where

L. P. gas would be a better and, in most cases, a more economical fuel. The substitution of propane for gasoline in one large tractor will offset the seasonal unbalance created by three or more domestic heating installations.

Only about 150,000 farm tractors now operate on L. P. gas. There are upwards of 4,000,000 still operating on gasoline. If one farm tractor in four were to be operated on propane, the seasonal unbalance would be wiped out.

In addition to farm power, we may look for another great development which is just beginning to be important, but which should soon become the second largest market for agricultural fuel. Artificial drying of some of our leading farm crops—corn, small grains, hay, cotton, tobacco, peanuts, soy beans, fruits, sweet potatoes—is increasing by leaps and bounds. Three great gains are made by farmers in drying these crops by heated air—saving in production costs, improvement in quality and market price, and protection against weather damage.

These, and other seasonal demands for heat in farming operations, offer the means of establishing the desired winter-summer balance in marketing L. P. gas.



State-by-state, for 1951, as reported by the U. S. Bureau of Mines in August 1952.

1 The Farm Market

THE greatest potential means of balancing the distributor-dealer's winter and summer loads is the conversion of farm power equipment. Taking the average throughout the country, one tractor conversion will just about balance three domestic heating installations. This varies, of course, with individual cases and to some extent in different areas.

In laying out a program for load balancing based on conversion of tractors and other farm equipment, the LPG distributor will do well to calculate the average gallonage per year per heating installation which he serves and to estimate the annual fuel consumption per tractor on the larger farms in his area. He also should be familiar with the average cost of converting the types of tractors in most common use in the surrounding territory.

Using the differential in cost per gallon between LPG and gasoline, he can arrive at the approximate length of time necessary for the farmer's fuel saving to pay back the cost of conversion and the number of gallons of fuel involved in reaching that point. Tractors using more than that number of gallons are his prime prospects for conversion.

It may or may not be worth-while to convert special harvesting equipment such as combines, forge choppers, etc. This depends to a large extent on the number of hours per year that the equipment is used. A wheat farmer, for example, who owns his own combine and uses it only two or three weeks per year would not be nearly as good a prospect as an alfalfa producer who uses a forage chopper during a season from 5 to 8 months long.

There are, however, a great many harvesting contractors operating combines who start the season in the southern part of the wheat belt and follow the harvesting season northward. In this manner they are able to get approximately 4 months' use of their combines and this makes it very much worthwhile for them to make the conversion investment.

Any other farm power equipment operating through a relatively long season becomes logical material for conversion. Irrigation engines, forage choppers, spray rigs, and feed grinders are logical engines to operate on LPG. Gasoline-operated domestic water plants and electric lighting plants are among the simplest and most inexpensive engines to convert.

Refueling facilities are an important item in connection with all of the above conversions. Tractors, harvesters, and spray rigs are all

conveniently filled from the domestic supply tank if the equipment is brought into the farm yard once a day. For outfits of these types which remain out in the field for long periods, a very convenient method of supply is to mount a 250 or 500-gal. tank on a trailer and take it right into the field. Filling of vehicle tanks will be faster and safer if a pump is used to facilitate the operation and the use of a vapor return hose is recommended.

Farm Power

• Tractors

THE largest single opportunity in the farm power market is the tractor. It is estimated that more than 150,000 have been converted. This represents a definite trend of buyer demand which has had a very considerable influence on the tractor manufacturers, six of whom are now marketing propane-equipped tractors in one or more of their standard models.

These manufacturers are Minneapolis-Moline, Oliver, J. I. Case, Massey-Harris, International Harvester, and Co-op. Most of these manufacturers also sell kits which include all parts and materials necessary to duplicate the factory LPG fuel system and engine changes to convert the equivalent gasoline models to L.P. gas operation. Other tractor manufacturers are known to be working on similar installations.

In addition to these factory engineered conversions, the LPG carburetor manufacturers provide tractor conversion fuel control units ranging all the way from simple spud-ins and adapters to complete replacement carburetors.

In converting a tractor for LPG operation it is always desirable to raise the compression of the engine and to provide some satisfactory means of cooling the intake manifold. Without these changes the fuel consumption is likely to be considerably higher than with gasoline, and there is a slight loss in power. With a high compression engine and cold manifold it is nearly always possible to equal and sometimes improve on the gasoline fuel consumption and also provide increased horsepower.

It has sometimes been claimed that this increased horsepower results in more frequent failures and greater maintenance expense in transmissions, differentials, and axles. This has not proved to be the case except in a few instances where the driver handled the tractor like a "hot rod." Actually, the smoother power of the LPG engine reduces the impact loads on the gears and driving mechanism, which should be expected to prolong rather than shorten the life of these units.

Stated in another way, practically all tractors are able to slip the wheels in low gear. This slippage will take place at a definite horsepower input regardless of whether the engine is running on its original compression ratio and gasoline, or on a higher compression ratio and propane.

Selling On Easy Payments

Many farmers would be glad to convert their tractors to butane-propane operation, but find it difficult to pay the conversion cost in a lump sum. As it is quite customary to pay for purchases in this price range on a "make it easy to buy" basis, it is

quite logical that time purchase privileges should be extended to these transactions.

Time purchase contracts which are to be resold to a finance company must of course be written on terms acceptable to the finance company—generally a substantial initial payment, and equal monthly payments until the contract is completed.

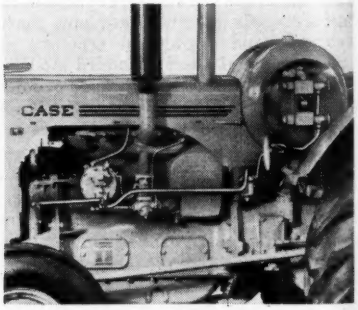
•

For distributor-dealers who are able to finance their own conversions, there is another plan which offers greater psychological advantages in making sales—payment out of savings. This plan has been worked out with variations by a number of successful dealers making engine conversions. The most commonly used is to ask the customer to pay the amount he is now paying for gasoline as the base price per gallon for propane, the difference between this and the established price for propane being credited to the conversion account until it is liquidated. After that, the price of propane for this customer drops to the established level.

Other dealers charge a flat increase per gallon of an amount lower than the fuel differential. In some cases, where tractors are in almost continuous use over a long season, this excess charge has been as low as 1c per gallon. (This amount is also frequently charged as a lease payment in making conversions of taxicabs and trucks in constant service.) Good business practice should be the guide in establishing the terms of the contract. The credit rating of the customer should be known, and payment should be complete within a predetermined period of not more than a year. Thus, in helping a farmer of good credit rating to buy, it might be desirable to add a low figure, such as 2c per gallon, to the price of the fuel delivered during the growing season, the unpaid balance to be paid off at a certain date after the farmer has had the opportunity to sell his crop.

Selling these conversions will be much easier if the amount of saving is estimated on an annual basis. The customer should be given a copy of this estimate, so he will know what to expect. The estimate sheet is also a valuable guide in selecting the gas customers who use enough fuel in their tractors and other farm engines to make it worth-while for the distributor-dealer to actively solicit conversions. The gas distributor who is really out to balance his winter-sum-

Plowing with propane tractor.



Gasoline tractor converted to burn propane.

mer load by farm engine conversions can very profitably make a complete survey of the gasoline consumption of all his farm customers. This will guide him in concentrating his efforts on those who can profitably make conversions.

• Crop Spraying

POWER spraying of farm crops is one of the most desirable outlets for L. P. gas. It is an excellent load balancer for the gas dealer, as the spraying season is confined principally to the spring and summer months. Spray rigs are used wherever orchard and garden crops are raised, and to some extent in field crops such as cotton, tobacco, and alfalfa. The local county agent can give you the picture in your territory, and can tell you who are the prospective customers. Farm equipment dealers selling spray equipment will be valuable contacts.

Power spray rigs are generally operated by two engines—one to drive the spray pump and one to move the outfit through the field. The one on the spray pump does the hard work, operating at continuous load output many hours per day, thus consuming a large amount of fuel. Butane-propane offers the advantages of low fuel cost, more dependable engine operation, less frequent need for repairs and overhauls.

The engine in the truck or tractor which moves the rig is idling most of the time, so it is subject to the same troubles which occur in city delivery service. If operated on gasoline, it puts excessive dilution in the crankcase oil, and is quite likely to develop cold sludge and excessive lubricating oil costs. Both of these conditions contribute to rapid engine wear and high maintenance costs. Use of LPG in this engine eliminates both sources of trouble.

Propane spray rig in an orchard.

There is another advantage in using propane in spray rigs which is not generally recognized, but is quite important in providing dependable service—the LPG is in a closed system, so it is impossible for spray solution to get into the fuel and stop the engine. Operators also point out that there is little chance for any of the company fuel to get into the tank of an employe's car while both vehicles are behind a tree.

• Forage Choppers

THE power for chopping plant stalks is generally supplied by a separate industrial type engine made by the tractor manufacturer or by one of the larger manufacturers of industrial engines.

The advisability of converting these units depends on the number of hours used per year. If in use for several months, it will be most economical to make a complete conversion, including high compression and cooling the manifold.

For units which are in use for a

relatively short season, the amount of potential saving may be balanced against the reduced efficiency of some simpler and less expensive method of conversion such as the omission of high compression, use of the standard manifold instead of the cold manimold, etc.

• Irrigation Pumping

IRRIGATION pumping offers a tremendous market in the more arid regions and in rice producing areas, and is taking on increased importance in the Midwest, where periodic drouths create the need for irrigation as crop insurance.

Pumping water for irrigating rice fields.

It provides an almost continuous year-round load in the desert valleys of the Southwest, a relatively continuous summer load in dry regions not enjoying rains during the growing season, and an intermittent summer load elsewhere. Rice is grown in flooded fields from planting time to maturity, so where water must be pumped for this purpose the operation is practically continuous throughout the growing season.

Irrigation pumping follows three principal patterns. (1) Raising water from the well or other source to the point of use, where it is applied with or without pressure, depending on the method of irrigation. (2) Raising the pressure of water obtained by gravity from canals or other low pressure sources, for the operation of sprinkler systems. (3) Return of the tail-water from the lower ends of the vats used in irrigation by flooding.

Irrigation by means of sprinkler systems is finding increasing use, particularly in producing alfalfa and wet pastures, but also with other crops which can stand wetting without damage. It is not used with irrigated cotton, because the wetting damages the fiber and reduces the market price; nor with melons, peppers, and other crops in which wetting would cause mildew or other damaging conditions. Where usable, the sprinkler system gives more uniform coverage and penetration, which results in considerable saving of water—more than enough to pay the cost of producing the necessary pressure.

It also avoids the high cost of installing the irrigation system for flooding, which includes leveling the land, throwing up dikes, and supplying the means for controlling water delivery. Sprinkler irrigation is particularly suitable for the Midwest, where its use is intermittent; it offers the advantage of low investment.

Where the water lacks sufficient pressure to operate the sprinkler system, a great many farmers are using trailer-mounted pumping outfits consisting of engine and pump to boost the water pressure. These are moved as needed, along with the lightweight surface pipes which are equipped with self-sealing slip joints and the necessary sprinkler heads.

The return of the tail-water to the upper ends of the vats, in irrigating by flooding, is becoming increasingly important with the shortage of water in most areas depending on irrigation. The excess water accumulating at the

low end of the vats either overflows and goes to waste, or soaks in beyond the economical depth and does no good. Trailer mounted pumping units and portable pipes without sprinklers are increasing in use for salvaging this otherwise wasted water. The return of tailwater is particularly desirable in fields which are fertilized by the introduction of anhydrous ammonia into the irrigation water, as excess water at the low end results in waste of fertilizer, and in some cases in crop damage due to over-fertilization.

L. P. gas makes the ideal fuel for irrigation pumping, because of the longer engine life and freedom from interruptions resulting from its use. It also avoids another trouble which has been serious in operating certain engines on gasoline in irrigation service. The operation of these particular engines at the constant load and speed required has kept the valves in the critical temperature range that causes excessive deposits on the valves and valve stems. The use of leaded gasoline in these engines has increased the build-up of deposits, and caused frequent failures and excessive mechanical expense. Operating on butane or propane, these same engines have stayed remarkably clean and free from valve troubles.

The conversion of pumping engines offers no serious mechanical problem. These power plants are generally either converted passenger car or tractor engines or industrial models produced by tractor manufacturers or the large engine factories such as Continental, Hercules, or Waukesha.

For the latter, the manufacturers and their agencies are able to supply high compression equipment and cold manifolds. The converted passenger

Trailer-mounted pumper on sprinkler irrigation system.

car engines may be high compressioned by planing the heads or in a few cases where it is necessary, by installing special high altitude pistons.

Irrigation engines in service through a long pumping season are among the easiest conversions to sell because their fuel consumption runs into high gallonage figures and the conversion cost is paid back very quickly out of savings.

Some LPG distributor-dealers in the arid regions and in rice producing areas own and lease portable irrigation equipment consisting of engine, pump, and fuel tank mounted on a trailer. Quite a number of farmers prefer leasing to owning this equipment because they are able to charge the entire expense into operating cost on their income tax reports, which enables them, under some conditions, to make a worth-while saving in income tax.

As an aid in selling conversions for irrigation engines, many distributor-dealers lease fuel tanks or sell them on a gallonage throughput basis to lower the farmers' immediate investment in the conversion.

• Small Stationary Engines

A LARGE number of small stationary engines are in use on farms for pumping water, supplying electrical current, grinding feed, and other incidental chores.

Most of these engines are produced by Kohler, Wisconsin, Onan Motor Co., etc. These companies all produce their engines to operate on either gasoline or natural gas.

The gasoline models may be readily and inexpensively converted to propane operation by installing natural gas carburetion equipment supplied by the manufacturers plus a primary regulator to bring the propane down to the correct inlet pressure for the natural gas regulator which is a part of the standard factory equipment.

These engines of small horsepower will operate satisfactorily with a tank vapor fuel system except in the coldest weather. For extremely cold weather, some method of vaporization by heat should be supplied.

The LPG tank which powers the cotton picker must be mounted for easy filling.

• Cotton Pickers

COTTON pickers are powered by gasoline tractor engines. The International Harvester Co.'s cotton picker is built on a Farmall M tractor.

The cotton picking machinery is built so close over the top of the tractor that there is no room for an LPG fuel tank with the picking machine mounted. It is still possible to convert the Harvester cotton picker in the customary manner, using a fuel tank equipped with a tunnel for the steering column.

When the cotton picking unit is taken off the tractor, the LPG fuel tank mounts in the customary place. When the cotton picker is to be installed on the tractor, it is necessary first to remove the fuel tank and

hang it on brackets which should be installed either on the side or at the rear of the picker frame underneath the hopper. This provides clearance for mounting the picker on the tractor and places the filler valves of the fuel tank in an accessible location.

• Corn Dryer Blowers

PORTABLE crop dryers have been produced with all possible combinations of oil or gas heat and gas, gasoline, or electrically driven blowers.

The working range of a portable crop dryer is definitely restricted if the blower is electrically driven. Every effort should be made to substitute a propane-operated engine for the electric motor.

Convert any gasoline blower engine to propane and provide drying heat by means of a propane burner. Operating the entire dryer on propane offers the greatest possible convenience and will be more economical throughout most of the United States.

• Combines

COMBINES are ordinarily built with an extra engine to provide power for the threshing unit. This is sometimes a small tractor engine made by the manufacturer of the combine, or in other cases it may be a commercial type engine manufactured by Continental, Hercules, Waukesha, or some other industrial engine manufacturer.

If obtained from the latter source, the engine manufacturer can supply a natural gas head for the engine, or it may be high compressioned by planing the head or installing high compression pistons, depending on the design of the engine.

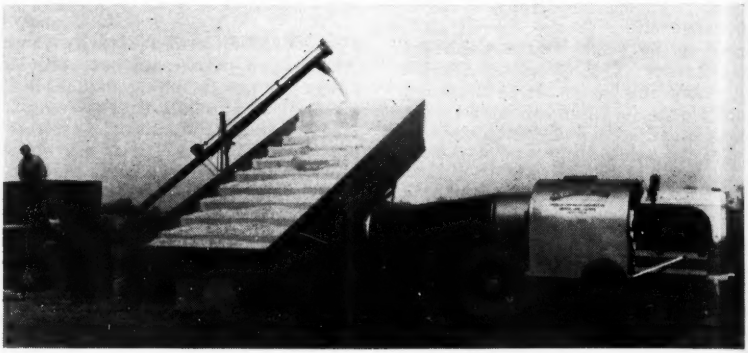
Some of the small tractor engines used to power combines are models for which the tractor manufacturers have not yet provided high compression equipment. Thousands of these engines have been converted in the field, mostly including planing of the head to secure the desired high compression.

Drying and Dehydration

CROP drying and dehydration offer a growing market for propane over a long period extending from spring or early summer almost to the beginning of winter. It will eventually become one of the most important load balancing factors.

The economic importance of controlled drying by means of heat is just beginning to be understood. It offers the means of saving crops which would otherwise be lost or seriously damaged by rain or unfavorable weather during the harvest season.

With forage crops it provides a method of preserving valuable nutrients which are destroyed in natural drying in the sun, so the feeding value is increased and the crop can be converted into greater



Portable batch drying bin, filled by elevator, unloaded by gravity, saves time and speeds drying of corn and small grains

production of meat and milk. It can be utilized to prevent the shattering off of leaves of alfalfa, clover and other leguminous hays which normally occurs in sun-curing, adding to the feeding value of the crop by as much as 35%. In many cases the crops have higher market value per unit of weight, because of higher quality.

While the two terms, drying and dehydration, actually refer to the same process—the reduction of moisture content by the circulation of heated air through the crop—"drying" generally refers to the finishing operation of reducing moisture to the ideal storage or processing condition in crops which are already partially dried by natural processes before harvesting. In this group are included grains, seeds, peanuts, hay and forage crops which are partially dried or at least wilted in the field before going to the dryer, and cotton.

"Dehydration" is generally used in connection with the processing of crops which come from the fields or orchards with full moisture content, the complete drying and curing operation being carried on under the artificial heat, as in the artificial drying of fruit, production of alfalfa meal, manufacture of potato meal and flour, and dehydration of other vegetables.

• Leguminous Hay

ARTIFICIAL drying is particularly valuable in connection with alfalfa, clover, peanut vines and other leguminous hay crops. In the green state, they contain exceptional amounts of protein, chlorophyl, carotene and other vitamins, which give the forage unusually high feeding values. Sun curing of the hay from these plants loses a high percentage of these valuable ingredients, which may be preserved fully or in part by artificial curing with heat.

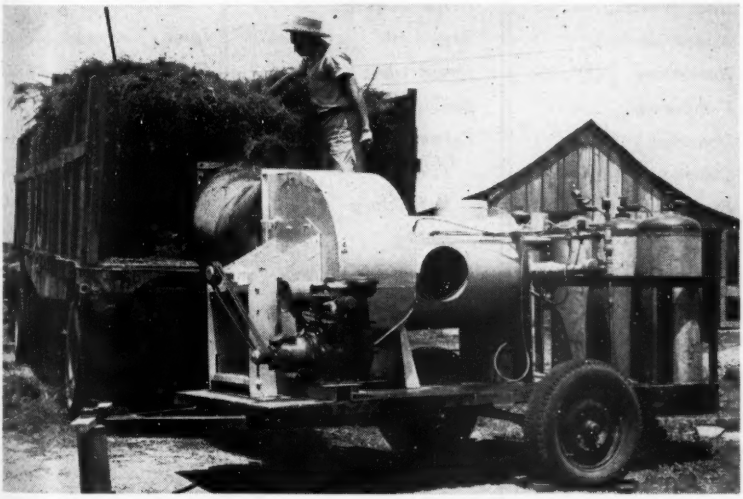
In addition, sun curing results in shattering of many of the leaves, which contain the highest concentration of nutritive ingredients of any part of the plant. During unfavorable weather, this shattering has sometimes caused the loss of as much as 35% of the leaves, which remain in the field, and cannot be recovered for storage.

Harvesting and drying practices with these crops vary considerably, some farmers employing field chopping machines attached to the mowers, drying the fodder in batches in a drying shed or hay-mow, or delivering it direct to a dehydrator plant producing alfalfa meal. Other farmers wilt the hay on the ground, gathering it up for loose storage or baling before it is badly bleached or dry enough to shatter.

With any of these methods of incomplete drying, it is desirable to complete the curing by artifial heat, in order to prevent mildewing or heating and fermentation. This may be done either loose, or after baling, with a small-scale or portable drying outfit.

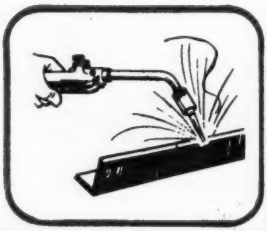
With loose hay, the process is to distribute the fodder evenly over tunnels constructed of wire mesh, which distribute the heated air, drying one batch at a time until its moisture content is reduced to the desirable level, then removing it and replacing with a fresh batch. With baled hay, the heat distribution channels are formed by piling the bales in a suitable arrangement. The heat-

The "Farm Market" section continued on Page 118.



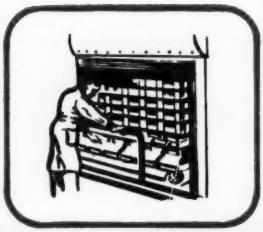
Feeding alfalfa into a Bishop Engineering Co. dryer.

2 THE INDUSTRIAL MARKET



Metal Working

Heat treating
Annealing
Hardening
Tempering
Drawing
Cutting
Brazing
Soldering
Forging
Metallizing
Bending
Ladle heating
Metal melting



Vitrifying

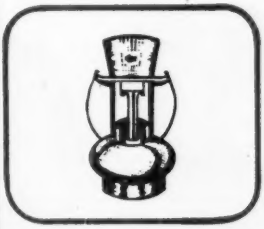
Brick making
Sewer tile
Drain tile
Building tile
Ceramics
  Tile
  Refractory
  Hobby
Glass making
Glass polishing
Porcelain enameling

Drying

Aggregates
Lime
Pumice
Minerals
Lumber
Paint
Foundry cores
Plaster drying

• *Guide to Industrial Applications*

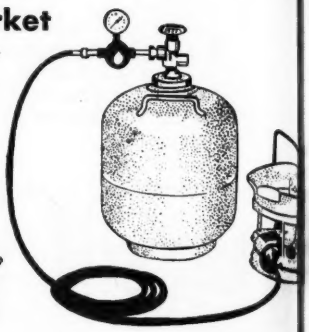
Here are 56 Reasons why the Average L. P. Gas Dealer should Analize His Market for Industrial Sales Opportunities.



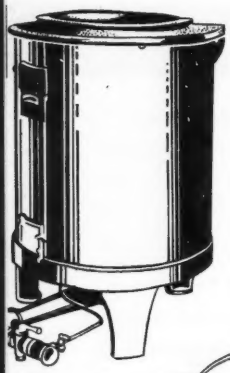
Railroads	Food and Feed	Miscellaneous
Air conditioning	*Fruit packing*	*Cleaning plants*
Dining car	*Canning*	*Cement blocks*
Switch heating	*Vegetable dehyration*	*Roofing*
Tire changing	*Alfalfa meal and pellets*	*Paving*
Cargo heating	*Slaughter house uses*	*Printing*
Cargo thawing		*Furnace pilots*
Rail bending		*Rubber products*
Weed burning		*Electroplating*
		Heating dial phone stations
		Smelting
		Cleaning vats
		Battery making

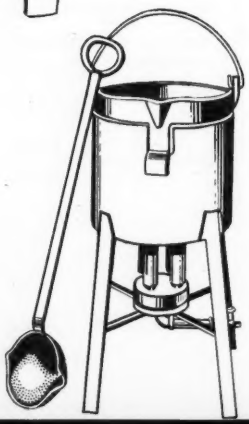
2

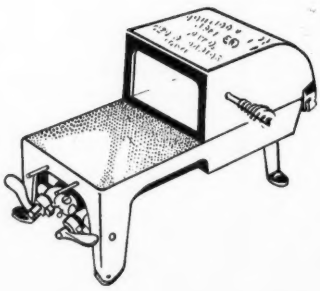
The Industrial Market



MORE AND MORE INDUSTRIAL FUEL APPLICATIONS OFFER . . . PROFITS!







• TORCHES • BOILERS

• BURNERS • OVENS

• FURNACES

BUTANE-PROPANE gas is the ideal fuel for producing industrial heat wherever its use can be justified on economic grounds. More of these profitable operations are being developed all the time.

The gas burns without soot, smoke, dirt, or objectionable chemical impurities. It does not deposit foreign substances on equipment or on the products undergoing processing. Atmospheric polution is held to the mimimum.

The control of flame temperature may be readily handled either manually or by automatic controls, and 100% automatic shutoff protection is included in almost every industrial installation. The heat may be used indirectly through boilers, or for higher temperatures through the Dowtherm vaporizer, which will provide temperatures from 350° to 650°F, with very low pressures.

A great many operations involving gas heat are conducted by direct firing, and wide ranges of burners, torches, special furnaces, etc., are available for these applications. Operating temperatures as high as 3200°F may be obtained by direct firing.

Operators working on the sale of L.P. gas for industrial consumption should be familiar with the basic equipment such as torches, burners, boilers, and standard furnaces. All of the major gas burner manufacturers produce some of these items, and they are glad to supply catalogs of standard equipment to any L.P. gas distributor.

A great many of the larger industrial applications will require specially engineered boiler installations or furnaces. These applications require competent engineering service, which in some cases is available through the plant engineering departments. If needed, the manufacturers are in a position to do this engineering for the customer.

In some cases the larger burner manufacturers market through special equipment distributors serving the major industrial areas. LPG distributors seeking industrial sales should be acquainted with the burner distributors in their areas, as in many cases these firms employ combustion engineers who are available to design special installations, or any burner distributor may secure the proper assistance from the factory.

A large number of possible industrial applications of butane and propane are included in the following pages of this section.

2 The Industrial Market

Metal Working

• Metal Cutting

THE potential market for propane in cutting metals is enormous. It can be used wherever acetylene is employed in cutting, and it has several advantages which will appeal to cost-conscious manufacturers, fabricators, dismantlers, and wreckers.

In production-line operations, where cutting is done at assigned stations, and where consumption is sufficient to justify installation of bulk storage, the fuel cost can be reduced to a very small fraction of that of acetylene. Using the propane in cylinders is likewise considerably cheaper; in some areas close to the point of production the cost is from one-fourth to one-half that of acetylene.

Unless bulk storage and piping are required, the cost of converting from acetylene to propane is negligible. Regulators, manifolds, piping, hoses, and torches can all be used without change, except for the torch tips. A full line of propane cutting tips is available for all makes of acetylene torches.

Propane is now used quite extensively as a cutting fuel in heavy steel industries, particularly in the Pittsburgh, Houston, Los Angeles, and Portland, Ore., areas. Every industrial plant in which heavy sheets, plates, forms, or bars are cut by torch is an important prospect

Railway roundhouses, maintenance plants for trucks, construction equipment, and oil tools, auto wrecking yards, steel scrap plants, and innumerable smaller business should be contacted.

Liquilux Gas Services, Inc., Houston, Texas, has done an unusually successful job of selling propane for metal cutting. The following information is condensed from a sales brochure issued by that company:

Propane gas costs considerably less than acetylene. A case is cited in which a company using 100 cylinders of acetylene per month requires only 20 cylinders of propane to do the same work, with a saving in fuel cost, alone, of more than $450. In another case, in which the manufacturer uses 75 100 lb. cans of calcium carbide per month in his own generator, 25 cylinders of propane do the same work at a saving of $375. (Based on cost of propane in cylinders at Houston.)

Facts obtained from actual tests prove that less oxygen is consumed per square inch of cut with propane than with acetylene.

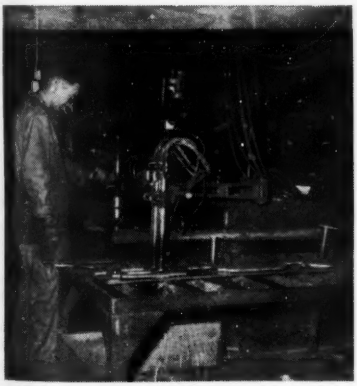
In addition to the saving in fuel and oxygen costs, the labor cost of cutting with propane shows a saving. No preliminary cleaning of the metal to be cut is necessary, as rust and scale blow off ahead of the propane flame. Propane cutting produces very little slag, and this is more easily cleaned off than the slag from an

acetylene cut. Propane cutting produces less glare, providing greater visibility and allowing an experienced workman to cut faster.

The propane torch will not flash back or pop, so less time is lost keeping the torch lit and adjusted. Propane cutting tips are easier to clean and to keep clean. A 100 lb. propane cylinder weighs only about 70 lbs., empty, while the equivalent acetylene cylinder weighs about 223 lbs., empty. The propane cylinder lasts from 5 to 8 times as long, so cylinder changing is easier, and much less frequent. Operation on propane eliminates the use of a generator—there is no carbide to charge into the machine, and no sludge to clean out.

Propane is a safer fuel gas than acetylene. This is brought out clearly by comparing the limits of flammability and ignition temperatures of the two gases, which are as follows:

	Flammability Limits in Air		Min. Ignition
	Upper	Lower	Temp.
Propane	9.6%	2.4%	950°F.
Acetylene ..	80.0%	2.5%	650°F.



Cutting operation on farm machinery with oxy-propane.

• Heat Treating

HEAT treating, tempering, hardening, annealing, and drawing, are processes for altering or improving the characteristics of metal parts after they are formed by forging, casting, extruding, etc. The changes in characteristics are produced by alterations in the grain structure of the metal, induced by heating to controlled temperatures, or by processing through a series of controlled temperatures, for specified periods. The metals generally treated by these processses are steel alloys, copper, brass, and alloys of the light metals.

Qualities Most Desired

Improvements most commonly desired in these processes are in tensile strength, rigidity, springiness, ductility, resistance to wear, resistance to fracture, and relief of stresses induced by the forming processes. In some of the treatments the operation is carried out in atmospheric air. In the surface hardening of machined alloy steel parts, it is desirable to prevent alteration of surfaces due to oxidation or formation of scale during the treatment processes in order to hold down cost of finishing. To obtain these results the treatments are frequently carried out under special atmospheres which are either devoid of oxygen or contain special gases which contribute to the hardening processes.

Propane is used extensively in these processes for supplying the heat, and for the production of the special atmospheres. For the treatments requiring only moderate temperatures, propane competes with natural gas on the basis of cost per million Btu's. In the processes requiring extreme temperatures, propane offers special advantages because of the higher Btu content per cubic foot of vapor, which

A Surface Combustion propane-fired furnace which may be used for a number of heat treating processes.

permits greater concentration of heat.

In producing special atmospheres, propane is competitive with natural gas on a basis of relative Btu cost, and offers equal freedom from undesirable contaminants. It has advantages over oil or other fuels in its cleaner combustion and greater freedom from contamination.

Since these processes are carried out on a year-round production basis, any fuel volume that can be developed in the metal treating lines is likely to be on a nearly constant volume. Fuel consumption in these industries is high, generally requiring large and frequent deliveries.

For small scale heat treatment operations which may be frequently found in small metal products industries, a number of burner manufacturers produce standardized furnaces which are listed in their catalogs. Installations for quantity production of special parts are generally designed by engineers qualified to handle these projects, using standard or special large size industrial burners.

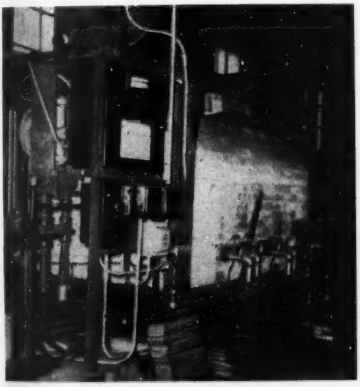
Some of these operations are set up for the exclusive use of propane. In other cases, plants designed for the use of natural gas are placed under the handicap of heavy "peak load" charges during certain hours of the day, or on a seasonal basis. In these situations a "peak shaving" propane installation will supply fuel at less cost during the peak load periods.

This is very desirable business, on account of its high volume and relatively constant basis. Standby plants, to supply emergency fuel in case of unexpected shut-downs of the utility gas supply, are also coming to be quite common.

• Metalizing

THE metalizing process is used extensively in machinery repairs to build up worn parts so they can be refinished to standard dimensions before being reassembled for service.

Special metalizing torches are available which feed wire of the correct chemical analysis into a high velocity flame. The compressed air driving the flame intensifies its heat and carries a fine spray of the molten metal which is deposited and welded on the area to be built up. The process is comparable to a spray painting job, using molten metal for the coating. Propane is the ideal fuel for this use on account of its high flame temperature and its low cost.



Heat treating furnace fired by propane.

• Forging

GAS is used extensively to heat the metal for quantity production forging of small parts. The larger operations all heat the parts in furnaces, but for small production and repair work individual burners for each piece are commonly used.

A variation of the forging processes occurs in the production of round ended cylinders for fire extinguishers, pressure vessels for chemicals, etc. These are frequently produced from cylindrical stock which is placed in a low speed lathe. The end to be formed is heated to the correct temperature, and the metal pressed down by a blunt tool as the cylinder rotates. For heavy work, torches are used to maintain working temperature while the forming is taking place.

For blacksmithing, gas-fired forges with electric blowers are now available to replace the old type coal forge. This has great advantages in that it is faster, cleaner and offers better control of the heat. Many of these smaller applications are available as prospective customers for every L.P. gas dealer.

• Brazing, Soldering

LOCAL mechanical repair shops, garages, jewelry shops, etc., do a good deal of brazing and hard soldering. This requires moderate heat which is ideally supplied by propane torches. L. P. gas is just as good for this purpose as acetylene and is faster than natural gas.

Radiator repair shops require gas torches for taking radiator cores apart and resoldering them. Natural gas does a satisfactory job where it is available, but any radiator shops not served by utilities need propane for their soldering torches.

The high heat of acetylene is not required, and propane operates at a very considerable saving.

Vitrifying

• Burned Clay Products

THE manufacture of brick, tile, sewer pipe, etc., is necessarily a local industry because the low price and great weight make it impossible to transport them economically over great distances. The manufacturing plants are therefore widely scattered, occurring near almost every population center where suitable clay is available.

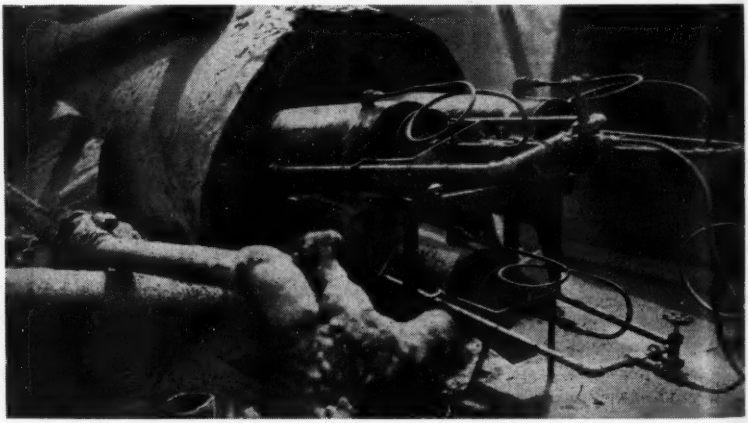
The process of manufacture consists of three steps—molding, drying, and burning.

Considerable power is required for excavating and conveying raw material and for moving the products through the plants. It may or may not be economical to provide this power with propane engines.

Drying is sometimes done in the open air under rainproof shelters. This requires a great deal of manual labor and many of the larger manufacturers are adopting quick drying systems consisting of heated tunnels equipped with conveyors or cars to move the products through the tunnel as drying takes place.

These drying tunnels require a large number of burners and consume a great deal of fuel, but this is considerably more economical than the air drying method involving so much hand labor.

After the products are dried, they are generally fired in beehive type kilns equipped with overhead burners. L. P. gas is an ideal fuel for these applications and in a number of large brick plants the overall operation has



An industrial drying operation in which special Mutual Liquid Gas Corp. burners are directed upon the product in a revolving drum.

proved to be more economical than with oil or other fuels even though the Btu cost of L. P. gas is somewhat higher.

Gas firing makes consistently better quality products with less spoilage than the other fuels. The combustion is clean and there is no damage to the product from soot deposits or from the presence of sufur which damages the surface appearance of the finished brick or tile.

In a typical large scale Western brick yard formerly fired by coal and converted to L. P. gas operation about three years ago, the management reports that the firing cycle in the kilns has been shortened from 14 to 11 days per batch. The labor cost in the burning operation has been greatly reduced, as one man per shift is now able to do all of the firing in the 11 kilns operated at this plant.

When they were using coal, a foreman was required to supervise each of the three shifts per day and it was necessary to keep a fireman and assistant fireman on duty at each kiln being fired. In addition, the movement of coal from the railroad to the kilns required extensive mechanization and considerable labor.

The saving in timekeeping, payroll taxes, and general overhead involved in taking care of the labor which is no longer necessary has been greater than the present salaries of the three employes used in the firing operation.

While L. P. gas costs more to buy in some localities than either coal or fuel oil, this is one type of operation in which the cost of use is considerably reduced.

• Ceramics

THE manufacture of ceramics offers a widespread market for L. P. gas, some branches of which may be found wherever suitable clay is available. L. P. gas has particular advantages for the firing of these special clay products on account of the extremely high controlled temperatures which can be developed. This results in minimum production losses and fastest possible production time.

One of the most outstanding specific applications for L. P. gas in the ceramics industry has been in the production of spark plug insulators. This is a tremendous quantity operation, highly mechanized and with extremely rigid quality requirements. Plants manufacturing laboratory refractory vessels are also finding L. P. gas as an ideal source of heat.

The most widespread opportunity for sale of propane in the ceramics industry is in the numerous moderate sized plants scattered throughout the country in which "art" pottery is produced. There are also numerous small pottery kilns which may be found in almost every locality, in which custom firing of hobbyists' ceramic items is carried on.

The most outstanding advantage of L. P. gas in all of these installations is its cleanliness of combustion, which results in unblemished surfaces and complete freedom from chemical contamination.

• Glass Making

GLASS making is a large industry in which most of the plants operate on a huge scale and consume tremendous amounts of fuel. Utility gas is nearly always used, but it is necessary to have stand-by fuel systems to prevent the tremendous financial loss which would be involved in a shutdown of the main fuel supply, or even a reduction in its available volume.

The stand-by plants nearly always consist of propane storage connected through a gas-air mixing unit to duplicate the Btu content of available utility gas.

Other glass factories in localities where utility resources operate close to maximum capacity during certain periods of the day, require "peak shaving" service to relieve the utility of the industrial load during periods when domestic requirements are greatest. This is steady business and highly desirable.

Another use for gas in glass manufacture, for which undiluted propane is preferable because of its higher heating value than utility gas, is heat polishing. This process is applied to low priced plate glass as a substitute for mechanical polishing. It is also widely used in finishing cut edges of household, laboratory or industrial glassware, to give them a smooth finish or to produce a thickened or beaded edge to provide extra strength.

For the latter uses the high heat content of straight propane permits higher production speed. The saving in labor cost more than offsets the increased cost of propane as compared to natural or utility gas.

• Vitreous Enameling

VITREOUS enameling is the surface coating of metals by the fusion of powdered glass into a continuous, impervious covering. It is used most extensively in the manufacture of domestic appliances such as stoves, refrigerators, washing machines, etc., and to a smaller degree for providing a corrosion proof and chemical proof lining for domestic water heaters, bulk transport tanks for milk, and transport and storage tanks for strong chemicals.

Plants producing items of the above nature utilize natural or utility gas as their main source of heat but rely on propane for stand-by and peak shaving service exactly as is done in the glass manufacturing industry.

There are vitreous enamel plants in a great many of the smaller cities scattered throughout the country. They produce a great many advertising and street signs and incidental enameled items for special uses. These small plants offer prospective markets for a great many L. P. gas distributors.

Drying

HEAT for drying operations used by numerous industries offers a tremendous market. The purpose of drying by means of heat is to speed up the production of materials. Shortening production time is equivalent to enlarging the plant capacity without increasing the investment or the tax burden connected with the operation of the plant.

There are industries in almost every locality which can profitably use heat for drying. These are easy sales to make because time and labor costs are more important than fuel costs. Most plants which need heat drying processes operate on a year-round basis and are conveniently located for deliveries. Sales may be made to plants now using heat drying processes on the basis of convenience of L. P. gas fuel and its freedom from soot or chemical contamination.

• Drying Aggregates

BUILDING sand and gravel are dried for several purposes. Some sand and gravel companies market ready mixed sand and plaster. For these uses the product must be completely dried so that it may stand in bags without setting of the cement or lime. The user needs only to add water, stir the mixture quickly and put it to use.

This can be a profitable side line for any building material company in a community, and if the local plant operators are not doing so, there is a possibility of creating a new market by making the suggestion.

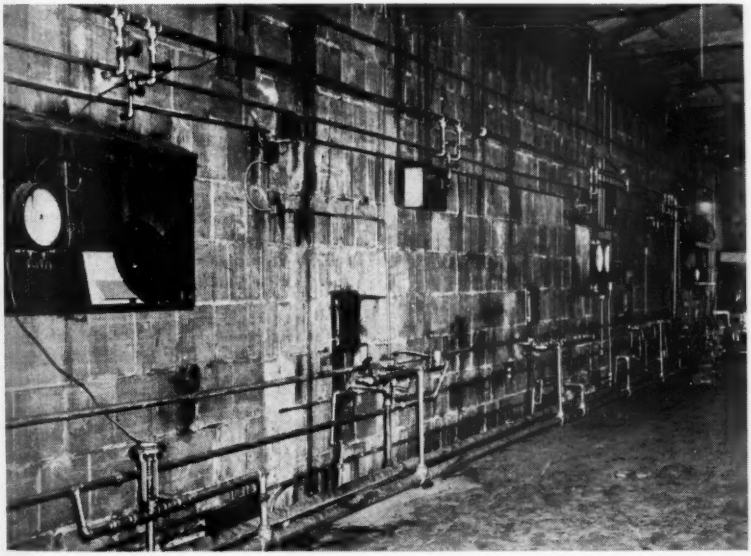
The usual drying equipment is a rotating cylindrical kiln which is fired at one end and fed at the other.

Sand and gravel should also be dried in preparation for making asphaltic concrete for "black face" paving. Somebody produces this material in every community.

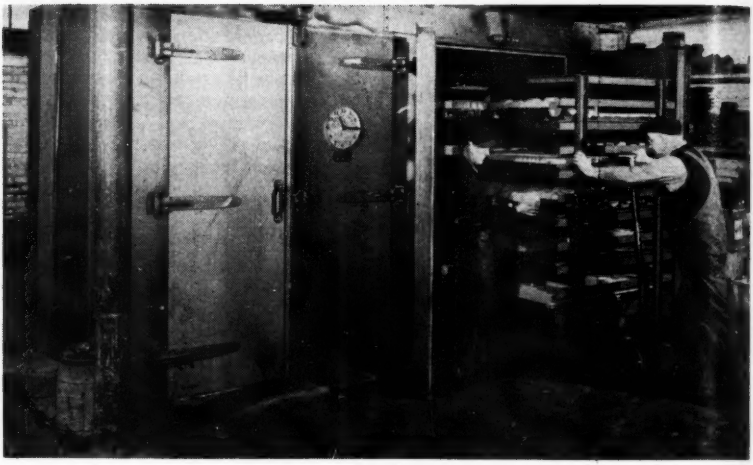
• Lumber Drying

LUMBER is kiln dried to shorten time necessary for it to dry out to the required low moisture content for use, and to prevent shrinkage after installation. This quick drying by heat also results in saving of yard space and reduction of investment in stored lumber.

Lumber drying may be carried on in small or large scale plants ranging from small fruit dehyrators used for lumber during the off-season to tre-



Battery of burners supplying heat for large commercial lumber drying kiln.



A core-baking oven in a Minnesota foundry.

mendous multiple tunnel and multiple oven outfits operating on a year-round basis.

Gas is a much better fuel than coal or oil for lumber drying because its clean combustion does not discolor the lumber. It also offers less fire hazard. Many lumber plant fires originate from dripping oil burners. The labor cost of using the gas is practically nothing as compared with the considerable expense for handling and firing coal. Lumber drying goes on continuously throughout the year.

• Drying Foundry Cores

MOLDED cores used in production of castings are dried by heat to speed up production and lower plant investment. Linseed oil is the base for the binder in these cores, and drying by natural processes requires several days. Baking the cores in ovens reduces the drying time to minutes or hours, depending on the size of the cores.

Special core drying ovens are available from burner manufacturers. These are suitable for moderate sized operations. Specially engineered ovens are built for the larger foundries. The smaller foundries are particularly good prospects for L.P. gas sales on account of the convenience of using the fuel and the low labor cost involved.

• Lime, Pumice, Minerals

THE manufacture of lime is actually a drying operation. It requires a large amount of heat, and few lime pits are located where they can be supplied with utility gas. LPG offers an advantage over oil because of its clean combustion, freedom from soot, and lack of any chemical con-

taminant which might discolor the finished lime.

Pumice is mined in a large number of places to use as a substitute for gravel in producing light weight concrete bricks, and for reduction in weight of poured concrete walls. Being porous, it can absorb a great deal of water and this is removed to save transportation costs. The operating season is generally year-round.

Minerals of both the metalic and non-metalic varieties may be dried to check oxydation or to lighten weight for transportation.

• Plaster Drying

A LARGE potential market for the use of gas for plaster drying has opened up in connection with the quantity production housing projects. These operations are set up on a time schedule which requires completion of each step within a certain number of hours, and readiness for the next operation at the time the crew is available to perform it.

Damp or cold weather delays the drying of plaster, which may result in idle crews and disruption of the entire production schedule. Room heaters and bottled gas provide the ideal solution to this problem. This potential market for gas exists wherever quantity production of homes is taking place. Many builders operating on isolated units can also use plaster dryers to advantage.

• Paint Drying

THERE are innumerable manufactured products which require painting. They range all the way from toys and household woodenware to farm equipment and contsruction machinery. Faster drying of paint reduces requirements of plant capacity and material in process.

Industrial paint drying is generally accomplished in tunnels or ovens which cut the time required to a very small fraction of that necessary for open air drying. Industrial paint drying tunnels are generally specially designed to cover a portion of the conveyor system used in the factory. The burner manufacturers are all familiar with the necessary construction features. The operating season is generally continuous.

Railroads

MOST of the air conditioning in streamlined trains is done by engines operating on L. P. gas. A great deal of this fuel is also used in dining cars where the fuel requirement is equivalent to that of a good sized restaurant. Additional uses in railway operation include the heating of perishable cargos in wjnter transportation and the thawing of bulk loaded commodities such as ore, coal, etc., in open gondola cars.

Increasing use is being made of propane for preventing switches from freezing. The railway roundhouse also provides a good market in cutting metals, changing loco-

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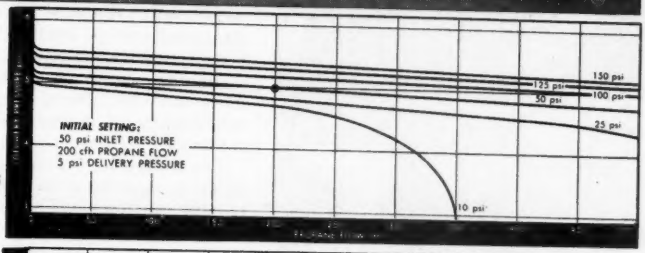

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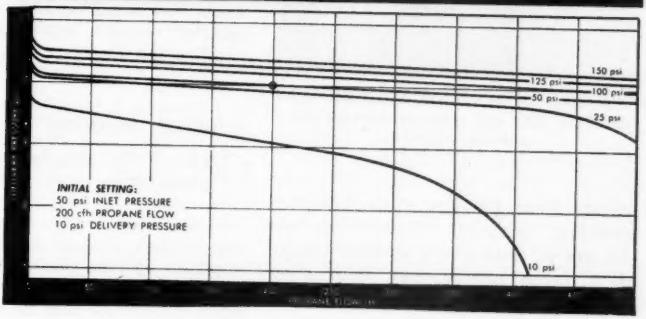

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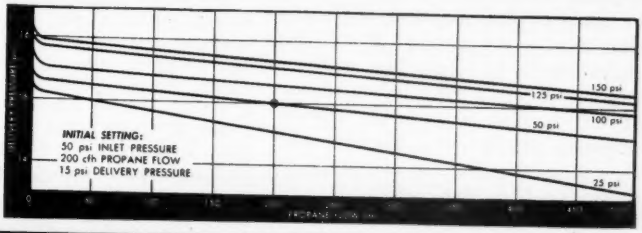

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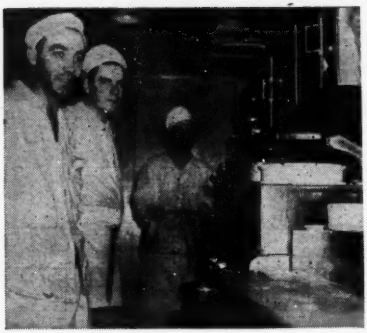


This diner on the Chicago, Milwaukee and St. Paul R.R. uses propane for cooking and water heating.

motive tires, bending rails, heating cleaning vats, etc. Deliveries for the major uses are generally made at division points, but deliveries for applications such as switch heating and cargo thawing must be made at local maintenance headquarters or at points where the operation takes place. The division superintendent's office is the source of information on possible sale of products now in use in the division, as well as the place to present new ideas for additional uses.

• Cooling, Dining Services

RAILWAY cars are individually cooled in the summer by the operation of small engines which provide power for compressing and circulation of the refrigerant. Fuel is carried under the cars in batteries of 200 lb. cylinders. All of the cars used by passengers in a standard train are generally air conditioned, and this uses a tremendous amount of fuel.

Purchases for such major purposes are generally made on a contract basis after competitive bidding, so a distributor with a particularly efficient operation located some distance from the point of delivery may have the opportunity of being the successful bidder.

The dining car of a standard train must be capable of feeding from 200 to 400 customers. This requires a great deal of gas for cooking and water heating. Purchases of fuel are handled on the same basis as air conditioning fuel.

• Switch Heating

ONE of the pressing problems in connection with railroading in cold climates is keeping the switches free from ice and sleet so they may operate freely when required. This is handled by the local maintenance formen, who transport the fuel from their operating bases to the switches.

There are many thousand switches which are not yet equipped with heaters, and the expansion of this activity offers a huge market for fuel during the winter. A standard battery of switch heating burners will operate from 40 to 45 hours on 100 lbs. of fuel. Arrangements for purchase of fuel are made through the division superintendent's office with deliveries going to the local foreman's maintenance headquarters.

• Cargo Heating, Thawing

THE transportation of crops subject to damage from freezing into northern market areas requires the heating of cars to insure arriving without damage to the commodity. Cars are equipped with special heating installations with fuel supplied from standard cylinders. Deliveries

are made to major freight yards which do not always coincide with division points.

The winter unloading bottom dump gondola cars of coal, gravel, sand, etc., which have become wet requires heating if the moisture in the cargo has been sufficient to freeze the material solid over the dump gates.

This thawing may be done with a permanent heater located at the chute, or by movable heaters which may be placed directly under the gates. This thawing is generally done by the customer.

• Weed and Paint Burning

MANY railways keep weeds and bushes cleared back from their right-of-ways. Burning with gas supplies the simplest and most economical method of effecting such clearing. (See section on weed clearing in farm applications.)

The repainting of all railway rolling equipment involves considerable use of torches for burning off the old paint. This work is done at a limited number of large plants generally located at main division points.

• Tire Changing, Rail Bending

THE treads of locomotive tires wear rapidly because of slipping on the rails while starting the train, and because of severe abrasion against brakes and rails while stopping trains. They are therefore equipped with tires which are shrunk on the permanent wheels. These tires are removed or installed by heating. Special ring burners are used in the tire heating pits.

Gas is the preferred fuel on account of cleanliness and convenience, and propane has definite advantages because its higher Btu content enables it to heat the tire to the required temperature in less time.

Rails should be bent to the correct radius for line curves and for switch connections to avoid danger of loosening spikes and going out of alignment due to the stresses in cold bent rails.

Necessary equipment consists of torches set into a manifold the length of a standard rail. Propane supplies the necessary heating quicker than natural gas, and this reduces labor costs in the operation.

Food and Feed

UNSUSPECTED opportunities for the sale of gas in the processing and preservation of foods and feeds may be found in many localities. For example, a Minnesota alfalfa meal plant burning oil for the dehydration of the alfalfa was operating successfully except for one drawback. The oil was poluting the alfalfa, making it unpalatable for cattle. So the plant was unable to sell its product at a profit. Following the receiver's sale, the new owners changed their source of heat to propane, and have since been disposing of the product at a premium and operating at a very satisfactory profit.

Other opportunities in the food and feed department are supplying heat for canneries, dehydration plants, local slaughter houses, poultry dressing plants, etc. The equipment required is generally standard burners, boilers or torches.

Small steam boiler installations in many local food production and processing plants may be profitably fired with propane. Advantages include automatic control, clean combustion, quick recovery after withdrawal of steam, and low operating cost.

• Alfalfa Meal and Pellets

PLANTS producing dehydrated alfalfa products use very large amounts of fuel, and operate from early spring to late fall. The alfalfa is generally chopped as soon as it is mowed, and dehydrated at once. Dehydration is done in a rotary kiln. The dried fodder is conveyed directly from the drier to the grinder. The meal is generally produced within two hours of the time the hay was cut. This permits the retention of a higher percentage of vitamins, chlorophyll, and protein than would be possible if the hay were allowed to dry in the field. For maximum vitamin retention the finished meal should be cooled immediately after grinding and stored in a closed storage chamber to reduce the circulation of air over the product to the minimum.

These alfalfa meal plants generally get their power from electricity, but in some localities propane driven engines would provide it at less cost. Oil is not a desirable fuel for firing the kiln because of the likelihood of contamination of the meal. Propane is therefore the ideal fuel for alfalfa processing in all plants located away from gas mains.

Large scale farming projects operating in connection with alfalfa meal plants frequently equip all of their farm power equipment to burn propane, which is conveniently supplied from the storage tank at the alfalfa meal plant.

• Slaughter Houses

LOCAL slaughter houses handling either poultry or livestock require large amounts of hot water, and in many cases use steam for sterilization. Gas is preferable to oil or coal for producing this heat on account of its cleanliness, its adaptability to automatic controls, and reduction of labor costs as compared to coal firing.

Other uses for gas in these plants include singeing of carcasses, cooking of special meat products, and smoking of meats.

• Canning, Packing, Dehydration

CANNERIES working on fruits and vegetables require large amounts of hot water and steam for processing the fruit and sterilizing the cans. The cooking is ordinarily done in steam chambers, so the boiler capacity of a cannery is rather large. L.P. gas makes excellent fuel for cannery operation because of low price, convenience of use and cleanliness, which is extremely vital in cannery operation. It is also safer from the standpoint of fire hazard.

In the packing of citrus fruits, warm water is required for washing and cleaning the fruit. Lemon packing plants operate on a nearly year-round basis, but oranges and grape fruit packing houses are generally seasonal. The packing of deciduous fruits

sometimes requires hot water, but this is only for a very short season.

There are a few dehydration plants working on vegetables, for which there is now a considerable market for overseas shipments. This dehydration is generally done in continuous type drying ovens heated by oil or gas .These plants operating away from utility gas mains should be excellent prospects for the use of propane. (See also fruit dehydration under farm uses.)

Other Uses

(Miscellaneous)

DIRECT heat and steam are used for many purposes in businesses and institutions, where propane offers the ideal fuel. They include:

Heating molds in plastics plants; operating garment presses; reconditioning fur, upholstery materials, plush, and velvet; heating industrial cleaning tanks; heating glue in paper box plants; operating small water stills; supplying heat in laboratories.

• Plumber's Pots

PLUMBER'S pots are among the most versatile and widely used of the small propane appliances. They are made for use on top of a standard trailer bottle, or separately from the source of fuel. They are ideal for melting small batches of metals such as lead, solder, and type metal, and for sewer compound, glue in cabinet shops, asphalt in roof repairing, and innumerable heating or "cooking" jobs which arise in all sorts of crafts and trades.

A number of manufacturers make these outfits with heating stove attachments, which are very convenient and are widely used for heating small spaces. Sportsmen use them for heating tents and cooking meals. Telephone companies use them to provide warmth for workmen doing splicing jobs on overhead cables during cold weather. Almost every garage or machine shop can profitably use a plumber's pot for the innumerable occasions which require a portable heating unit of small size.

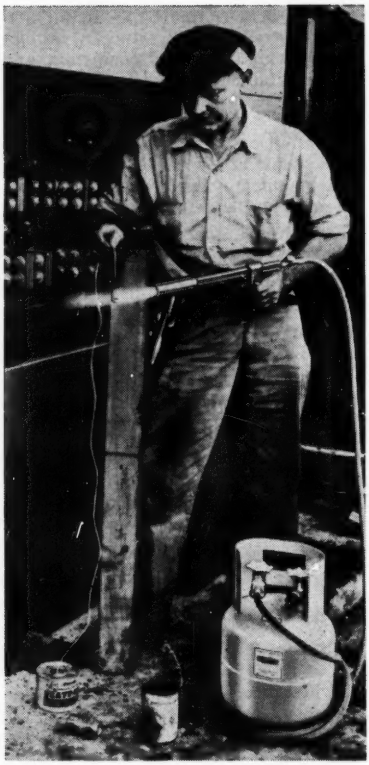
Since these are in constant demand, it is recommended that every propane distributor-dealer should carry at least one of two or three basic models in stock, and keep a constant look-out for places to sell them.

• Torches

NUMEROUS manufacturers produce a wide variety of standard torches which are applicable to many uses in every community.

LPG torches are often used for separating joints which have been sealed previously with lead or sewer compound. Many plumbers also do sheet metal work and require torches for the larger soldering operations.

Every L. P. gas salesman should be familiar with the different types of torches and their uses, and the distributor-dealer should carry a reasonable selection of the models most likely to be in local demand in a special display along with the domestic appliances and other standard sales items. Catalogs showing the other standard production items of the torch manufacturers should also be



Heavy duty torch, used in soldering electrical connections. *Courtesy Industrial Engineered Products Co.*

available for ready reference to aid in the selection of the unit most likely to fit the customer's precise need. The entire organization, including the drivers, can profit from attendance at company-sponsored meetings at which the uses of torches are explained and demonstrated.

The possible uses of propane torches in industry are almost numberless. These applications may be made in almost any community: rivet heating; heating engine castings preparatory to welding; bending pipes, tubes, and beams; repairing fenders; straightening automobile frames and axles; rebabbiting bearings; burning paint; repairing composition roofs; manufacturing and repairing batteries; tinsmithing.

• Fighting Forest Fires

THOUSANDS of propane burners are used by the forest services of the federal government and various states and counties for back-firing to prevent the spreading of forest fires.

Long handled burners giving high flame velocity are used, the fuel being supplied from cylinders. Most of the equipment in use includes a back-pack cylinder holding about 2 gals. and weighing approximately 35 lbs. This supplies fuel for about 4 hours operation. The gas torch is more effective in kindling the back fire than oil or any other method, so the effectiveness of the individual fire fighter is greatly increased.

In fire fighting where access roads are available, larger burners and standard house cylinders are sometimes carried to the fire on trucks or jeeps, the burner being operated directly from the vehicle.

Supplies of filled cylinders are maintained at forest department headquarters. Solicitation of this business may be done at the local foresters' headquarters.

• Printing, Electroplating

NEWSPAPER plants require heat for melting metal in typesetting machines for electroplating. Commercial printing plants use perforated tubular gas burners to apply gas heat for drying ink on freshly printed

paper, and to remove static which would interfere with orderly stacking of the printed paper.

The melting of metal in these plants requires continuous heat through the day, and it is general practice to burn a small flame under the pot over night so work may start immediately in the morning without waiting to melt cold metal. Where utility gas is not available propane is the practical answer.

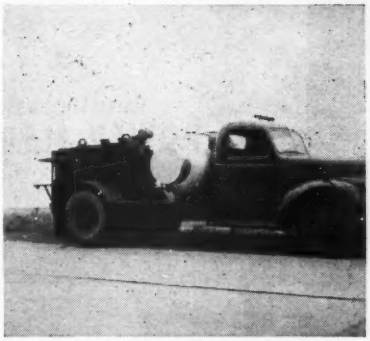
The electroplating process is accelerated by using the solution at high temperature. Some electroplating vats are steam jacketed as a precaution against fire hazards which might be present in direct heating of certain of the plating solutions.

L. P. gas is an excellent substitute for utility gas in any of these plants not connected with a gas company main.

• Roofing; Rubber Products

NEARLY all roofing contractors use asphalt kettles for melting the asphalt compounds used in laying asbestos and felt roofings. The majority of these are fired with kerosene burners which produce smoke and objectionable fumes. In most cases kerosene is more expensive than propane and is not so satisfactory from the standpoint of steady supply of heat. Asphalt kettles equipped with propane burners are produced by a number of manufacturers and if originally equipped with oil burners, these may be readily converted.

There are an infinite number of plants scattered around the country in which rubber products are molded. The proper curing of the rubber requires application of controlled heat which is generally done by steam jacketing the molds. Probably the largest number of such applications available for L.P. gas distributors is in the tire retreading and recapping plants, although there are a great many small plants in moderate sized communities which mold other rubber products. Any of these plants may well use propane for their heat.



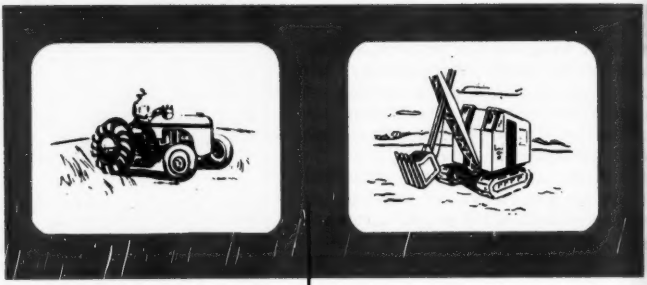
Truck-mounted asphalt kettle used for sealing expansion joints, at work on a Minnesota highway.

• Cement Blocks, Paving

THE curing of cement blocks is accelerated by passing them through a steam chamber to secure the original "set" of the cement. This requires a steam boiler which may be most conveniently supplied by propane where utility gas is not available. This industry provides a large potential market in many small communities.

City street departments and highway maintenance departments use a great many asphalt kettles for preparing the joint sealing compound used in expansion joints of concrete pavements. Propane is preferable to oil for the heating of these kettles because of its convenience and economy. Many street and highway departments are using propane heated kettles for these purposes.

3 THE POWER MARKET



Tractors

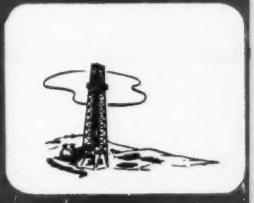
Farm
Contractors
Utilities
Material handlers
Mining
Lumbering

Construction

Earth movers
Shovels
Cranes
Tractors
Trucks
Ditchers
Fillers
Elevators
Compressors
Road blades

• *Guide to Power Applications*

The Power Market is Spreading to New Fields. Look into These Opportunities for Equipment and Fuel Sales.



Materials Handling

Gravel pits
Quarries
Aggregates
- *Crushers*
- *Sorters*
- *Mixers*
- *Elevators*

Mining
Compressors
Locomotives
Ore moving equipment
Electric generators

Transportation

Trucks
Buses
Taxicabs
Automobiles

Miscellaneous

Sawmills
Oil well drilling
Sewage plants
Diesel conversions

3 The Market for POWER

ANY gasoline engine, and most high speed diesel engines, may be converted to operate at least as well on propane as on their original fuel. In most cases power may be increased. Engine operation is smoother, due to more uniform fuel distribution. Fuel consumption may be brought reasonably close to the same basis per gallon, in some cases showing a reduction of consumption. Lubricating oil remains cleaner, lasts longer, and does not need to be changed so frequently. Engine wear is reduced, making the need for overhauls less frequent, and reducing the cost of maintenance.

These advantages, plus the low cost of the fuel in all areas except those remote from sources of production, are coming to be recognized by engine operators. With steady improvements in carburetion equipment, and rapid increase in the knowledge of conversion methods, the power market is growing faster than any other branch of the L. P. gas industry. According to figures just released by the U. S. Bureau of Mines, use of butane and propane in internal combustion engines more than doubled in 1951 over 1950. The figures quoted in the Bureau of Mines report were: 1950, 129,818,000 gallons; 1951, 289,991,000 gallons.

The greatest gains were shown in Texas, California, Illinois, Oklahoma, Louisiana, and Kansas. All of these states are extensive producers of L. P. gas. Other states producing natural gas, and the agricultural states bordering on those showing the leading gains, likewise showed a substantial increase in the use of butane and propane as power fuel.

In areas where winter conditions seriously hamper, or completely shut down the outdoor construction industries, conversions to propane offers another important means of balancing the winter-summer ratio. The handling of building materials follows the same seasonal variations as the construction industries.

● *The various applications of butane and propane in farm power equipment are the most attractive phase of the power market for the average distributor-dealer. They represent one of the important opportunities to bring summer consumption up to the level of winter demand, and thus make possible the balanced load so vital to the industry's future.*

Most of the other important power fields—transportation; oil well drilling, mining, sawmills, and miscellaneous uses of internal combustion in industries, are on a fairly constant year-round basis. They offer a steady load, and are generally quite desirable from the standpoints of volume and delivery economy.

While the individual L. P. gas distributor-dealer may not have the knowledge to handle his own engine conversions, there are automotive and implement repair shops in almost every community where this work may be done. The gas distributor should maintain friendly relations with all of these shops, as cooperation can be mutually beneficial. He should certainly be acquainted with the local tractor and truck agencies handling the lines which are now coming out of the factories equipped with propane carburetion.

A great deal of help may be obtained from the independent shops doing conversion work, in selling fleet operators in the transportation, contracting, and building materials fields on the use of propane.

These operators, and farmers having tractors which consume high annual gallonage of fuel, will be most interested in the item of fuel cost, and this should be the standard approach in soliciting conversions, unless it is known that the operator is having other troubles due to fuel which propane would correct.

The low-cost fuel argument is far more effective if the saving is presented on the basis of a year's consumption, or some other period which will show an impressive figure. If the differential is 5 cents per gal., the saving on a gallon is only a nickel, and thinking in these terms against a conversion cost of $200 or $300 is not very impressive. But if an engine uses 20,000 gallons of fuel in a year, the potential fuel saving is $1000. Even if the engine is expected to consume a little more propane than gasoline, making the saving even less, it is still a very effective argument.

The additional savings coming from the cleaner combustion, longer life of lubricating oil, freedom from fuel dilution, and longer engine life, are then attractive in the sense that they are a bonus with the substantial saving in fuel cost.

3 The Power Market

Tractors

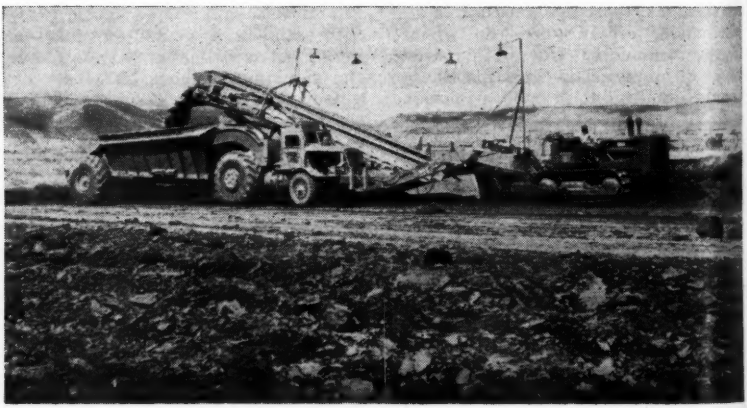
Construction

THE best market for tractor fuel sales is found on the farm. Applications of tractor power on farms start on Page 73.

Among other uses are those made by the lumbering and mining industries; by construction contractors, and in materials handling. These appear on following pages.

CONTRACTORS engaged in earth moving industries such as the construction of highways, dams, levees, canals and pipelines, buy tremendous quantities of fuel. They operate a great deal of gasoline equipment which can be converted to propane operation with good advantage to themselves. Ex-

A 23-cu. yd. earthmover on dam construction project.



tra power in the equipment, which may be obtained by increasing compression ratios to the maximum practical point, always results in speeding up the job and reducing the final cost.

Many of the larger construction projects are planned on a production line basis, the entire operation being scheduled in relation to the capacity of certain key vehicles or earth moving units. With a specific number of gasoline powered transportation units scheduled in relation to this key machinery, extra power obtained by converting the engines to propane will frequently result in the elimination of one or more vehicles in the series. This results in a saving of payroll costs, maintenance costs and overhead items.

All of these large scale operations require extra transportation and earth moving units to permit layoff for scheduled maintenance operations and necessary overhaul periods for engines. The requirement for surplus vehicles is lessened by conversion to propane, because engine overhauls are not required so frequently.

Public utility companies and the public service departments of cities are also users of extensive fleets of digging, ditching and filling equipment for the laying of pipelines, while all cities, counties and states maintain fleets of highway construction and repair equipment. These are excellent prospects for conversion of power equipment to propane.

They offer the particular advantage of having their operating bases located within easy delivery distance of bulk plants. Their fuel requirements vary considerably with the seasons in northern latitudes, but are relatively constant throughout the year in milder climates.

Types of equipment used in these construction activities, which may be profitably converted to L. P. gas operation include: Tractors, earthmovers, shovels, cranes, loaders, ditchers, fillers, road blades, trucks, elevators, compressors.

Materials Handling

THE production and local distribution of building materials obtained from the earth is a widespread industry in which L. P. gas has many profitable uses. The operation of sand and gravel pits requires a large amount of power for digging and elevating machinery. After the material is out of the pit it requires segregation or sorting, which is done in a power driven, perforated, rotating cylinder. Moving the segregated material to stockpiles or to loading hoppers, requires additional power.

There are numerous gravel pits around the country in which the sole dependence for power is on propane operated engines. The distribution fleets handling these products in their various forms, and transporting dry Portland cement and mixed aggregates offers ideal opportunities for conversion of en-

gines from gasoline to propane fuel.

Of special interest in this connection is the operation of the "transit mixed" cement fleets. Each vehicle is equipped with two engines—one to drive the truck and the other to turn the hopper.

These building material fleets consume enough fuel to pay back the conversion cost within the first year, and if the sand and gravel plant from which they operate has propane storage for the plant machinery, no additional investment is required to supply the vehicles.

This business is seasonal in northern latitudes, varying with the increases and decreases in local building activities. Throughout areas enjoying mild climates, it comes very close to being a steady year-round consumer of fuel.

The equipment used in the building material industry which might be profitably operated on propane includes:

Shovels, cranes, elevators, conveyors, tractors, crushers, sorters, mixers, loaders and trucks.

• Mining

SOME of the largest strip mining operations in the world depend on propane for the operation of transportation equipment running between the digging machines and the railways.

The Mesabi iron range in Minnesota was the location of the pioneer operation of this kind, and operators in those mines now use some of the largest ore moving vehicles in the world.

The strip mining of coal is another tremendous operation in which propane has played an increasing part.

There are many smaller strip mining operations widely scattered throughout the country, which offer excellent opportunities for the conversion to propane.

In the northern latitudes these undertakings are excellent load balancers, as work must necessarily be limited to the warmer months. Further south where domestic heating requirements are less, the mining can be more continuous throughout the year.

The hard-rock mining industries also use much power-driven equipment, both for operating drills and moving ore underground, and for processing in the above ground departments. Some use is made of engine-driven compressors and gasoline powered ore car locomotives. This is safe and practical where adequate ventilation is provided, but in any of these cases propane is preferable on account of cleaner combustion, lower carbon monoxide production, and the absence of objectionable fumes. Ventilating fans and electric generating plants may be driven by propane, as well as ore crushers and above ground trains and conveyors.

Transportation

MOST transportation equipment is used on a fairly constant basis and consequently fuel for these accounts contributes to a high year-round volume with deliveries planned periodically.

Even the electrical industry recognizes the importance of propane for power in heavy duty hauling.

The most desirable prospects for conversions are the large fleets of heavy duty trucks and buses operating over specified routes and having contact with established fueling facilities. Truck fleets operating out of their own bases and having their own fueling facilities are ideal. City bus fleets share these same advantages as conversion prospects. Trucks working on franchised routes where fueling facilities may be arranged en route are likewise excellent prospects.

All of the vehicles in the above classes consume large quantities of fuel and consequently where L. P. gas may be obtained at prices substantially below gasoline, the cost of conversion may be paid back quickly from savings in fuel cost.

City delivery fleets, particularly route trucks in dairy delivery, parcel service, bakery routes, soft drink distribution, and similar activities also offer outstanding opportunities for LPG conversion although their consumption of fuel is very much less than in the heavy duty types of operation.

The engines in these city delivery vehicles operating on gasoline are subject to very rapid wear and high maintenance cost because of their abnormally cold operation. This leads to dilution of the lubricating oil with unburned fuel, and the development within the crank case of an acid type of sludge which not only impairs the lubricating quality of the oil but also induces cold corrosion which is a very im-

portant factor in the rapid wear to which these engines are subject.

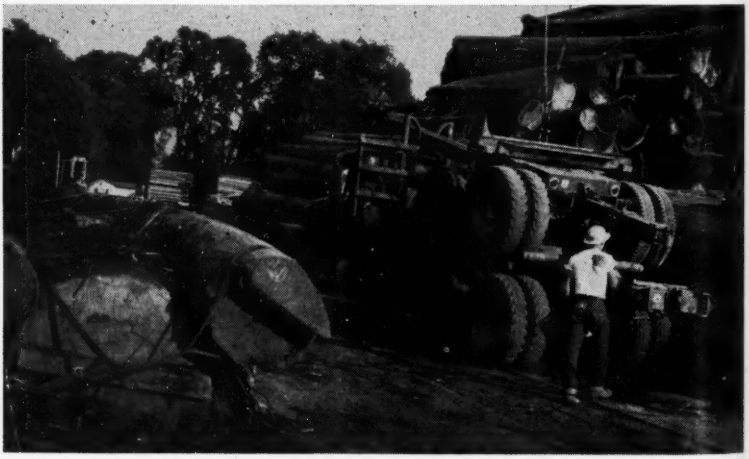
The substitution of L. P. gas in these engines eliminates the fuel dilution and also prevents the formation of acid sludge. It is not uncommon for these city delivery engines after conversion to propane to run satisfactorily from 3 to 4 times as many miles between overhauls as it had previously been possible to operate them on gasoline.

Taxicab fleets are in a sort of intermediate position. The payoff is slower than with heavy duty equipment, but in this type of service the saving in engine maintenance cost is greater per mile than in heavy duty operation. Taxicab engines share the cold operating problems of the city delivery fleets although this condition is not so pronounced in taxi service.

Itinerant truck operation has been the least attractive prospect for conversion in the past, due to the uncertainty of refueling facilities along unknown routes. LPG truck stations are appearing with increasing frequency along the highways and in a great many cases butane-propane bulk plant operators are willing to cooperate with truckers by filling their fuel tanks at the bulk plants.

• Trucks

THE consumption of fuel is so high in heavy duty trucks that it pays to take all the steps necessary to secure maximum efficiency with LPG fuel. This includes raising the compression in the engine, preferably



LPG-burning truck which does a big hauling job in logging operations

above 7½:1 and, if equipment is available, to a ratio as high as 8½:1. With certain engines even more. Intake manifolds should be replaced or altered to get the coldest possible operation.

A few models of truck engines develop trouble with receding intake valve seats when operated on LPG fuel. These should be equipped at the time of conversion with alloy steel valve seat inserts.

The selection and mounting of fuel tanks for converted trucks is a matter of great importance on account of the many safety requirements. Certain states and all insurance companies have definite requirements in connection with fuel tanks and their installation on vehicles, and these regulations should be understood and followed by the mechanic making the conversion who should have in his possession a copy of the NBFU Pamphlet No. 58 which is obtainable from the National Board of Fire Underwriters, 85 John St., New York City. In addition, he should have the state codes applying to areas in which the trucks that he converts are likely to operate.

A great deal of additional information which will be valuable to the people installing the conversions is contained in the BUTANE-PROPANE POWER MANUAL.

The most effective talking point in selling conversions to truck operators is saving in the cost of fuel. Where a good conversion job is done and a fuel differential of 5 cents per gallon below the cost of gasoline prevails, it is generally possible to pay off the cost of conversion of a heavy duty truck within the first 4 to 6 months. The reduced lubricating oil and maintenance costs and the reduction of lost time for maintenance operations come as a bonus.

Fueling a passenger bus from an LPG dispenser.

• Buses

BUSES come in the same general category as truck fleets, and conversion of buses may be sold on the same basis as has been outlined under the "Trucks" heading.

Propane offers two additional advantages in bus operation which are of considerable importance, since both have a definite bearing on rider satisfaction, which is reflected in increased patronage and higher revenue.

The production of unpleasant and sometimes sickening exhaust fumes has been characteristic of city bus operation on gasoline and diesel fuel almost everywhere, and few bus operators have been able to eliminate it completely in spite of costly equipment and high maintenance expense. This "halitosis of the exhaust" does not occur when operating on propane. The public relations department of any big city bus operating company may be counted on to lend wholehearted support to any program

which will eliminate the above source of public dissatisfaction.

Another factor of considerable importance in the operation of buses equipped with mechanical transmissions is the noticeably smoother engine operation in the low speed range, which makes it possible to go up through gears with considerably less unbalancing of passengers.

• Taxicabs

CERTAIN special considerations should be borne in mind in converting taxicab fleets to propane. There is limited space in the taxicab for the installation of a propane fuel tank and this may be aggravated, and permissible tank size reduced, by the necessity of carrying two-way radio communication equipment in the trunk.

If the taxicab happens to operate until the propane fuel supply is low, and then pick up a passenger who requires a long ride, running out of fuel could be very embarrassing. Most taxicab operators therefore consider that it is also desirable to retain the gasoline fuel system for emergency use.

Since it may be necessary to operate on gasoline at intervals, it is advisable to retain a gasoline compression ratio in the taxicab engine. in these dual-fuel jobs it is best not to raise the compression ratio beyond that which is satisfactory with the gasoline the taxicab company is willing to use. Every effort should be made to have the operator supply ethyl gasoline as the emergency fuel, in which case the safe comression ratio is approximately 7.5:1. This will ordinarily result in a slight loss in miles per gallon on propane as compared to gasoline. This should be taken into consideration in calculating the estimated savings. This will seldom amount to more than 10%.

The American Taxicab Association has devoted a great deal of attention in conventions and in its publication, the "ATA Journal," to the matter of propane conversions, and good ground work has been laid to make selling easy.

Various sales plans have been successfully used in different parts of the country for getting taxicab business. Leasing the equipment on a per gallon royalty basis has been done in a number of successful conversions. Other LPG distributor-dealers have been able to develop business on a deferred payment basis, taking the payoff out of a small increase in price per gallon.

The carburetion equipment outlasts the taxicabs, and may be readily transferred to the new vehicles as old ones are replaced. The adaptor type carburetor, sandwiched in between the air cleaner and the gasoline carburetor, is very practical for this type of operation, although a number of taxi fleets are operating with the spud-in type of propane connection going directly into the venturi of the gasoline carburetor.

• Passenger Automobiles

EXPERIENCED conversion men seldom spend much time, effort, or money promoting individual passenger car conversions. The same outlay expended in the development of fleet sales or tractor sales is generally more profitable. The old-timers as a rule take such individual passenger car conversions as may come to them without effort, and let it go at that.

Only those cars with unusually high annual mileages will save the cost of conversion, so the operation should not be recommended unless the owner drives at least 20,000 miles a year.

Other Uses

(Miscellaneous)

• Sawmills

SAWMILLS utilizing internal combustion power are scattered throughout all timber producing areas. Many of them operate throughout the year. Their fuel consumption is higher per engine than in the average truck of equal horsepower, and the cost of conversion is recovered very quickly out of savings.

The greater dependability of engines operating on propane and the less frequent need for engine overhauls make the use of propane particularly desirable in sawmill operations, as there are less payroll losses on account of the engine being laid up for repairs.

• Oil Well Drilling

PROPANE is widely applied to drilling for oil. It is the most convenient fuel for wildcatting, and it offers the great advantage of being used alternately with natural gas where the latter is available in one location but not in another. Manufacturers of engines suitable for oil well drilling are able to supply them with natural gas compression ratios and natural gas carburetion equipment.

The only thing necessary to convert these engines to L. P. gas operation is to add a primary regulator and vaporizer and the necessary shutoff valves, and connect them to a propane storage tank. These outfits consume tremendous quantities of fuel, and in most areas they operate throughout the year.

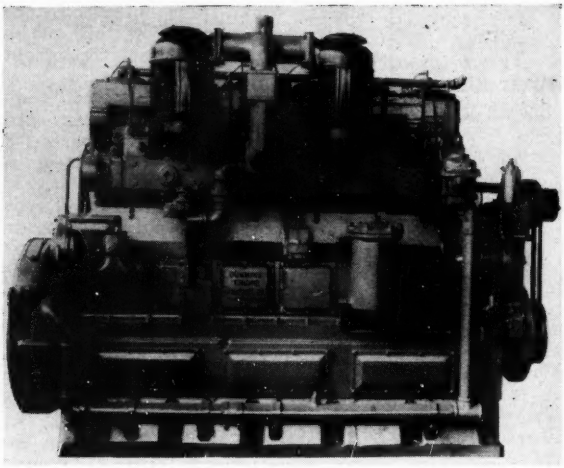
Diesel engines now in use in oil field drilling may be readily converted to gas operation, using conversion equipment supplied by the engine manufacturers. After a driller has used the propane gas-natural gas combination, he is seldom willing to use anything else. The drilling crews almost universally prefer propane as it produces more power in the same engine. (See also "Diesel Conversions.")

• Diesel Conversions

MANUFACTURERS of diesel engines of sizes likely to be used around the oilfields design these units so the same basic engine may be used for the construction of either a diesel model or a natural gas engine.

Certain models are designed so either gas or diesel fuel may be used alternately, merely by changing the position of a lever. In at least one of the G.M.C. industrial models, the fuel control is so graduated that operation may be had on any mixture, from straight diesel oil to almost straight gas. In these dual-fuel engines the gas is burned in the regular diesel combustion chamber, using a "pilot charge" of diesel fuel to ignite the gas.

In other makes the gas conversion operates on a conventional spark ignition system. The conversion involves rather extensive mechanical changes. A magneto and spark plugs are substituted for the diesel fuel pump and injectors. Special heads, and in some cases heads and pistons, are installed to provide the lower compression ratio necessary to operate on gas with the spark ignition system. A manifold



The Cummins multi-fue engine for oil well drill ing, pipe line pumpin stations, principal po er plants, irrigatio pumping, cotton gin and all heavy-duty work, operates on L. P. gas, natural gas, o diesel fuel with limite adaptations. It is a 6 cylinder, spark-ignitio engine rated at 315 h.p.

suitable for gas replaces the plain air intake of the diesel engine, and carburetion equipment is added.

While both of these systems are designed for alternate operation on natural gas, it is only necessary to add a primary regulator and vaporizer of the correct characteristics in order to operate on L.P. gas. Propane should be used in these engines instead of butane, as the compression ratios are too high for the latter fuel. Information on the correct regulator and vaporizer combinations will be supplied by the larger L.P. gas carburetor manufacturers.

There are a number of applications of these engines in which the use of propane is particularly advantageous. In wildcatting for oil, the engine may be used on propane, and if natural gas is discovered, the substitution of that fuel involves only the connection to the pipeline and turning two valves. If the drill rig is later moved away from the source of natural gas, conversion to propane is equally simple.

Many of these convertible diesel engines will be found operating cotton gins, water pumps, and other heavy duty equipment, using either diesel oil or natural gas for fuel. In any case, a study of the economic factors should be made to determine whether or not a change to propane would be advisable.

• Sewage Treatment Plants

AN interesting new use which can provide a small local market for propane in almost any part of the country is as stand-by fuel for sewage treatment plants.

Power is required to operate the agitators in the treatment tanks, and the pumps which move the effluent. Most of the time this is supplied by trapping the gas (methane) which is produced as a by-product of the reduction of the solids contained in the sewage, purifying it in rather simple apparatus, and using it as fuel to operate the engines supplying the power.

Cut costs 2 ways with INTERNATIONAL'S factory-installed LPG fuel system!

The new International "LP" Roadliner models, the first trucks with an LPG fuel system listed by *Underwriters' Laboratories*, save you BIG MONEY 2 ways:

1. You save with a fuel that delivers a power and economy comparable to gasoline—but a fuel which generally costs *several cents less per gallon!*

2. You save on maintenance. Clean-burning LPG virtually eliminates deposits on valves and cylinders. Both engine and cylinder wear are greatly reduced. There's less contamination of lubricants. Parts last much longer. Oil changes are fewer. Mileage between overhauls is *substantially increased!*

Add this spectacular *new economy* to the all-around truck stamina that has kept International first in heavy-duty truck sales for 20 straight years and you get a matchless combination of efficiency. Get all the details about International "LP" Trucks from your International Truck Dealer or Branch — now!

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International Harvester Builds McCormick Farm Equipment and Farmall Tractors... Motor Trucks... Industrial Power... Refrigerators and Freezers

INTERNATIONAL TRUCKS

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New International "LP" models with famous Super Red Diamond Engines. Available in four and six wheel models, 42,000 to 65,000 pounds GCW's. Dual heavy steel pressure tanks store fuel safely under all operating conditions.

The "Farm Market" section—continued from Page 81.

ed air seeping through the bales completes the cure.

Hay cured by either process, and stored where there is as little circulation of air as possible, retains a higher portion of the food ingredients than is possible with field-cured hay. Some authorities claim that the artificially dried product is worth, in actual feeding value, from $15 to $40 more per ton than would be possible with sun curing.

Any surface moisture from rain or dew is automatically taken care of in the heat-drying process. This limits the possibility of weather damage, and increases the number of days available for harvesting these crops in areas subject to summer rains.

Drying by artificial heat is useful in hay and forage made from grasses, silo fodder, and similar plants, in preventing spoilage due to rain, and in preserving chlorophyl and such nutritive ingredients as may be dissipated during complete drying in the sun. Grass hay with a bright green color is more palatable to stock, consequently they clean it up more thoroughly, leaving less to be wasted and trampled.

Harvesting and curing practices parallel those in dealing with alfalfa and leguminous hay. Artificial drying of grass hays is worth-while from the economic standpoint, but the gains are not as outstanding as with the leguminous crops.

• Corn

THE need for artificial drying of corn varies with the wetness or dryness of the season, and with temperature conditions at the time of harvesting. Warm, dry weather late in the season reduces the need. Prolonged late rains and low temperatures tend to damage or reduce the feeding value of a high percentage of the crop. This loss may be prevented or greatly reduced by the use of artificial drying equipment. The past season was one of the worst in history. Millions of bushels were lost due to molding or decay, much of which could have been prevented with adequate drying equipment.

While the corn may be properly cured any time from maturity until winter, there are several advantages in harvesting and drying as early in the season as possible. Yields of as much as 15% greater may be obtained by picking and drying in October, as compared with late November and December. Early picking also makes it possible to pick the crop cleaner with a mechanical picker. Less fuel is required to dry corn during the higher temperatures which prevail earlier in the season.

Various methods of drying corn are described in the literature put out by the portable dryer manufacturers. These range all the way from closed steel drying and storing bins to modified wagon boxes, converted hay barns, and a number of other devices which can be quickly constructed on the farm. Ear corn is generally dried in batches, but shelled corn may be handled by continuous flow processes in permanently installed drying plants.

Drying bins for both ear and shelled corn, and suitable for individual farm use, are available from dryer manufacturers. Shelled corn drying bins are adaptable to mechanized handling of the grain, thus increasing the throughput capacity by reducing handling time. The shelled corn bins are particularly suitable for the use of

This Bishop Engineering Co. dryer mounted on a Massey-Harris combine is for drying grain freshly cut in the fields.

custom operators, as they can be moved right along with the dryers.

Grain	Maximum Drying Temperature
Ear Corn	130°
Selled Corn	140°-160°
Hybrid Seed Corn	110°
Wheat	140°
Oats	140°
Barley	110°
Rice	110°-120°
Grain Sorghum	150°-160°
Seed Grains	110°
Soy Beans	130°

Moisture Content Safe for Storage	
Shelled corn in the bin	13%
Ear corn in the crib	18%
Oats in the bin	13%
Wheat in the bin	13%
Barley in the bin	13%
Sorghum in the bin	12%
Rice in the bin	13%
Soybeans in the bin	11%
Peanuts	10 to 12%

• Rice

RICE generally comes from the field with a crop-moisture content as high as 25% or even 27%. Like any other grain, this must be reduced to 14% or less, in order to prevent moulding or heating and fermentation.

Large commercial rice drying plants operate on the continuous flow system, and consume tremendous amounts of fuel for a short season, with occasional short runs in case the stored grain absorbs atmospheric moisture in quantities likely to cause damage.

Some rice growers dry their own grain, after sacking, over tunnels fitted with holes on which the filled sacks are laid. These tunnels carry heated air, driven by a blower, which escapes through the sacks of grain. In order to get the grain dried uniformly, the sacks must be turned, and drying must proceed intermittently, allowing time between runs for the moisture within the grain to equalize.

Too rapid, or too continuous drying makes the kernels brittle, which results in shattering during the milling process, with resulting low average price for the processed rice.

The operating season begins about the middle of September, and continues well into November. The amount of fuel consumed is high in relation to the quantity of rice put through the dryer, on account of the high moisture content as the grain comes from the field, and because of the necessity of re-heating after the intermittent stops in the drying process.

• Small Grains

WHEAT, oats, barley, sorghum grains, and other grass seed crops are now generally harvested with "combines", and moved immediately from the field into storage. If the grain is cut at the most desirable time, it still contains too much moisture for safe storage in bulk. If allowed to stand in the field until it is dry enough for storage, there is danger of serious losses from rain, wind hail, birds and insects. The delay in harvest may also cause conflict with other farm operations.

Excess moisture in bulk stored grains causes heating within the mass, and the moisture and high temperature induces growth of mold. The heat also provides ideal conditions for the growth of insects, which multiply rapidly in a warm environment.

By drying these grains prior to placing them in storage, spoilage can be eliminated, and insect damage kept at a minimum. The drying season is short, but the big commercial drying equipment operated at the elevators is in service continously for this brief period.

Small grain drying is an ideal application for propane, and this is another case in which it is superior to oil on account of freedom from contamination of the product. Propane is also likely to be less expensive on a yearly basis, as there is no standby charge to run up costs during the non-operating period.

• Seed Crops

THE proper drying of seed crops, particularly those on which the agricultural economy depends, is a matter of tremendous importance.

If stored with too high a moisture content, there is danger of molding and loss of germination. In artificial drying of these seeds, great care must be taken not to let the temperature go high enough to impair the germinating quality.

The operation is therefore one of slow drying at low temperature. Most of the hybrid corn seed and a great deal of the small grain crop used for seed undergoes artificial drying. This may be carried out with standard commercial drying units.

Small seeds such as tobacco, flowers, and a great many vegetables which represent very high values for small quantities are handled in specially constructed small drying units, with the seeds in cloth bags to prevent loss.

• Cotton

EXCESS dampness from any source, unless dried out quickly after picking, results in damage to cotton fiber—discoloration or weakening—and if this is allowed to happen, the quality of the fiber can never be restored.

Moisture may be present in the cotton as a result of rain or early morning dew, and all mechanically picked cotton absorbs moisture from the pick-

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ing spindles which are moistened by a fine spray to secure proper adherence to permit picking the cotton out of the boll.

Ideal practice is to dry the seed cotton to a moisture content of 7% as quickly as possible after picking. This is ordinarily handled in connection with ginning, the cotton being carried from the wagon to the gin by a column of heated air which performs the drying as it transports the cotton.

Mechanically picked cotton contains a considerable amount of trash which must be cleaned out before it reaches the gin. The cleaning is much more effective if the leaves and pieces of grass and weeds are dried before reaching the cleaner. The gins handle the cotton faster with moisture content reduced to 7%, and cotton with excessive moisture content clogs the saws of the gin. This stops the operation until the saws are cleaned.

Drying equipment is built as a part of the gin installation, and the change to L. P. gas from any other fuel is simple and relatively inexpensive.

• Sweet Potatoes

SWEET potato production is assuming increasing importance as improved curing and storage methods prolong the season during which potatoes can be marketed and enlarge the area in which they can be grown. In addition to the demand for them as human food, they are coming to be the chief dependence as carbohyrate stock feed in the Southeastern states.

Until the modern curing and storage methods were developed, losses in storage due to black mold, decay, and freezing limited the importance of the crop.

Limitations on tobacco acreage during the past few years have given increased opportunity for profitable production of sweet potatoes as they grow satisfactorily on the sandy land in the Southern tobacco belt. The crop comes to maturity about the close of the tobacco season and may be satisfactorily cured and stored in the tobacco barns, provided these barns are equipped with automatically controlled gas heat which makes it possible to hold the storage temperature between 50° and 60°.

During the heat curing process, extensive conversion of starches into sugars takes place, which increases palatability and improves storage qualities. Curing is done at low temperature and is complete when the skins are properly dried and the carbon dioxide resulting from conversion of starch into sugar has been withdrawn from the tubers. There is little loss of moisture or reduction of weight involved in the process.

The potatoes are cured in crates, which are stacked to provide circulation of heated air passed through the pile from the bottom, and withdrawn and exhausted from the building through ventilators in the roof.

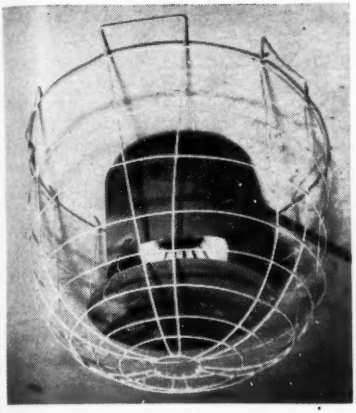
Fuel consumption averages 30 gals. per 1000 bushels.

• Tobacco

TOBACCO probably offers the largest market of any farm crop for propane for drying fuel. It provides a steady load over a long season, generally extending from July through September.

The load balancing characteristics of this operation are excellent as the fuel used in drying from 5 to 10 acres of tobacco balances an average domestic heating installation. It is estimated that there are between 500,000 and 600,000 tobacco barns in the United States which are heated with fuel other than propane.

Commercial tobacco drying equip-



Individual burner, lighted, for tobacco curing, showing guard basket, heat spreader pan and wind screen.

ment is simple and relatively inexpensive. It consists primarily of shielded burners and automatic control equipment. A barn with capacity for curing the crop from 5 acres requires from 60 to 80 burners. In order to insure sufficient vaporized fuel to operate all these burners during the cool nights toward the close of the season, it is customary to install 1000-gal. storage tanks or two 500-gal. tanks. The cost of the complete installation ranges from $1000 to $1200 per barn including storage tanks.

A great deal of experiment station data and the experience of a large number of tobacco growers indicate the following advantages for propane curing as compared with wood, charcoal, oil, or other fuel: lower cost; no contamination with foreign odors or flavors; complete freedom from soot deposits which are customary with oil; elimination of "pole rot".

Gas cured tobacco shows a higher average grade and brings a better price. Automatic controls on the gas curing system reduce labor costs and free the operators for productive work in the fields. A gas curing system is fireproof. It is no longer necessary to keep night crews on the job for fire protection; or if the owner handles his own firing, his sleep is not interrupted to tend fires and patrol barns.

Quicker curing (12 to 24 hours less time) permits one-sixth more throughput. Elimination of flues permits curing of more tobacco per filling of the barn. Controlled uniform drying results in greater weight of cured tobacco.

Various growers estimate the extra profits resulting from their change to gas curing at from $100 per acre in areas producing low-priced tobacco to as high as $300 in the case of shade grown tobacco.

A more complete discussion of this important subject was published in the August, 1952, issue of BUTANE-PROPANE *News*.

• Nuts

THE largest use of butane-propane gases in drying nuts and the greatest advantages of its use occur in connection with English walnuts produced on the Pacific Coast.

Both the quality and the market price of the nuts are improved by artificial drying. Walnuts with clean shells and light colored skins on the meat bring the grower from 2½ to 3 cents more per pound than nuts with dark skins and black stains on the shells. This amounts to from $50 to $60 per ton, and this premium makes it worth while to go to considerable extra expense to produce top quality nuts.

For highest market quality the nuts should be knocked or shaken from the trees as soon as they mature

and before the cracking hulls start to dry. At this stage the inner skins are white and the meat contains high moisture content.

The nuts are prepared for drying by removing the hulls mechanically and washing the shells clean of tannic acid. Drying is done in a batch loading hopper with a wire mesh bottom, tight sides, and open top. Air heated to 110° F is forced through the filled hopper by means of a blower.

The operating season is usually from 4 to 6 weeks in duration, and this short season makes the use of L.P. gas particularly advantageous.

• Peanuts

PEANUTS are becoming of increasing importance because of the demand for edible oil. Air drying in the field has been practiced in the past, but this requires from 8 to 10 days, during which time damage due to damp weather is a considerable risk.

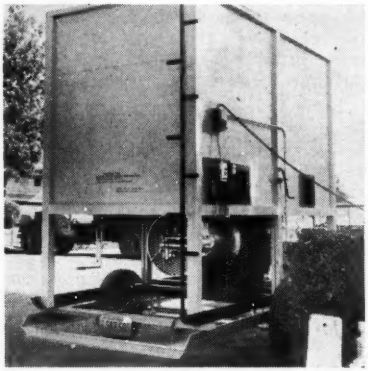
The vines may be converted into hay as a valuable by-product, but in order to make the best hay, harvesting must be done before the vines dry in the field. For this reason heat curing is a definite advantage.

When harvested at this stage, the nuts contain a large amount of moisture which must be reduced to a maximum of about 10% in order to insure proper storage. The most satisfactory results have been obtained by harvesting as soon as the nuts reach maturity, taking the nuts off the vine and curing the hay and nuts separately by artificial heat.

Depending on moisture content, 8 to 24 hours of drying time are required. This is a short operation confined to a few weeks in the fall. Hay should be cured at 170° temperature but exposing the nuts to temperatures above 120° imparts a burned taste and affects germination.

Drying equipment for the nuts may be of the tunnel type with nuts in bags laid over the openings, or special hoppers may be constructed for bulk drying. Heat-drying not only prevents weather damage to the crop, but growers report that artificially dried nuts bring from 15c to 25c more net per bushel.

The hay when artificially dried has better feeding value and generally brings a substantial increase in price.



Nuts are dried in bins by forced circulation of heated air.

• Fruit

MOST of the dehydration of prunes, apricots, and peaches is done in the three Pacific Coast states. Apples are dehydrated there and in several localities in the East.

Fuel consumption in fruit dehydration is high, but the duration of the drying season is short. A typical Western dehydrator turning out 8 to 10 tons of dried fruit per day consumes approximately 200 gals. per day.

Fruit dehydration plants require a

relatively high investment with considerable mechanization to handle the washing and scalding operations and to fill the trays and transport them through the dehydrator. It therefore pays for the operators to use them for other purposes if possible.

In order to prolong the season, many operators dry other products on a custom basis. For example, a typical prune dehydration plant will operate on apricots for from 2 to 3 weeks during the early part of the season before the prunes are ripe. Walnuts may be dried following the end of the prune season.

Other special crops, including garlic, may go through the same dehydrator. There are a few prune plants in which lumber is kiln dried during the season when fruit crops are not available.

The advantages of dehydration of fruit as compared with sun drying include the elimination of damage due to rain or fog, the complete avoidance of wind-blown dirt or trash, uniform quality of the product, a little greater weight of finished fruit, and lower labor cost. This is because changes of weather during the sun drying process require frequent stacking of the fruit to protect against fog or unseasonable rains, and unstacking after the sun comes out. This is all avoided in the dehydration process, which requires but a few hours.

Gas is a superior fuel for dehydration because of low cost and freedom from contamination of the product with odors, flavors, or soot which have resulted from the use of oil. With gas the firing is direct, that is, the products of combustion go right along through the dryer with the heated air.

• Soy Beans

THE curing of soy beans presents the same general problems as are characteristic with small grains, and follows the same procedures.

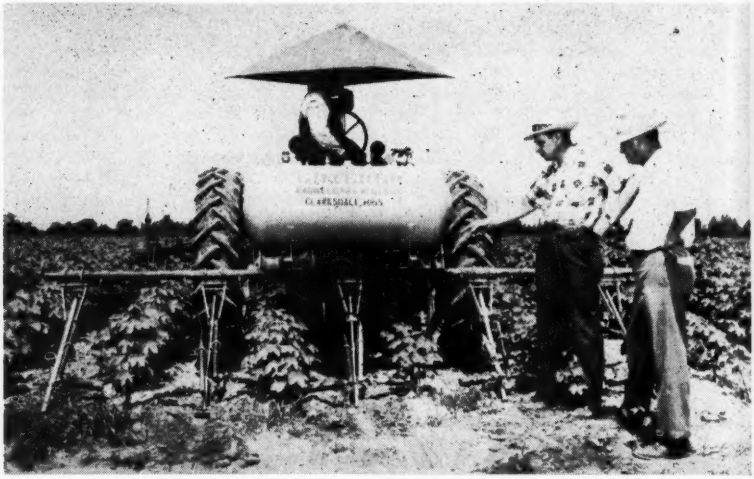
General practice is to reduce the moisture content to 11%. Buyers dock the price if the beans are found to contain excess moisture.

Other crops of limited geographical distribution in which heat-drying is advantageous are as follows: flax, hops, citrus meal, peppers and garlic.

Burning

RESEARCH in the application of heat for the control of weeds and insect pests, and the recent development of specialized torches and torch applications for these purposes, has opened up a rapidly growing field for the sale of butane-propane gases during the spring and summer months, when consumption is so badly needed to balance the winter heating load.

The successful development and marketing of special apparatus for these purposes has likewise done much to alleviate the farm labor shortage, and to hold production costs to a tolerable level. Mechanized flaming units for weed control are in some cases enabling one man to do the same amount of work which for-



Flame weeders, like this, have revolutionized the cotton industry.

merly required 50 laborers using hoes. Production per acre is being increaed, and there are many cases in which the quality and the market price of the product are improved.

There are few activities in which an LPG distributor-dealer can engage which will result in such great benefit to his customers as in stimulating the use of propane for the control and destruction of agricultural pests.

• Flame Cultivation

"FLAME cultivation" is a term used to describe the operation of destroying young weeds in crop land. It is most widely used in cotton production, but it is adaptable to many other row crops, such as corn, sugarcane, soybeans, and certain vegetables.

Various plants are able to withstand higher temperatures than others, depending on cell structure, thickness of bark, and other factors. Most of the common farm weeds, when young, can tolerate less heat than the agricultural plants in the groups to which flame cultivation is applicable; hence, it becomes possible to apply sufficient heat to kill the weeds without harming the crop plants.

The weeds are not actually burned, the exposure to the flame merely searing the cell structure sufficiently to cause damaging loss of moisture or induce fermentation within the stalk, after which drying out completes the destruction of the weeds.

While a great deal of research and development work are still being done on flame cultivation, sufficient progress has been made to bring commercially produced and practical equipment into the market. The equipment consists essentially of a fuel

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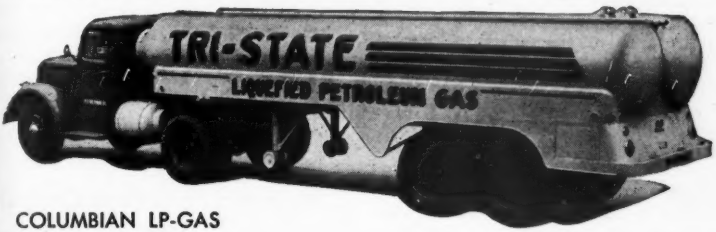

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supply tank, a vaporizer, a frame for mounting and spacing the adjustable burners, and the necessary connecting tubes and valves for adjusting the flames.

The burners must provide a high velocity flame. Propane has proved to be the most satisfactory fuel for use in these flame cultivators.

Tractor Furnishes Motive Power

The flaming equipment is mounted on, or attached to a tractor and driven through the field at the speed which secures the length of exposure necessary to kill the weeds but leave the crops undamaged. The burners are adjusted so the flames sweep across the rows from both sides, at a low angle, so all weeds which are not within reach of the cultivator blades will be destroyed by the fire. Cultivators are nearly always mounted so the same trip through the field provides tillage between the rows while the flames are killing the weeds which the cultivator cannot reach.

Flame weeding is particularly valuable in raising cotton which is to be picked mechanically. It not only cleans out the weeds which would produce trash in the picked cotton, but it also injures the lowest buds on the cotton stalks. This causes the plants to develop their main branches at a slightly higher level, thus producing the lower bolls at a level which reduces the damage from mud splashed up by any hard rains after they have opened, and also placing them within reach of the mechanical fingers of the cotton picker.

Fields in which flame cultivation is practiced are noticeably free from cotton bolls, as the insects feeding on the young cotton leaves are shaken to the ground by the passage of metal arms attached to the burners. The flames then kill most of the weevils, reducing the number which are able to reproduce and cause further damage later in the season. The flames also cook thousands of seeds of grass and weeds which might otherwise sprout and develop after the cotton has grown so large that weed control is no longer possible.

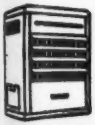
A five-row flame cultivator is said to be able to do as much work as 50 hoe hands. Complete mechanization has in some instances resulted in production of cotton with only 11 hours of man labor per bale, where the old hand-labor production required 235 man-hours. After allowance for the investment and operative costs of the mechanical equipment, cost per bale has been reduced by more than $50, and the yield per acre has been considerably higher.

See also item in "Poultry" section on use of portable torches for disinfecting and controlling insect pests in poultry houses.

• Flaming Alfalfa For Insect and Weed Control

REPLACING chemical sprays for the control of insect pests and annual weeds in alfalfa, propane flaming outfits are doing at least as good a job, with a smaller number of treatments and at considerably less expense. This is a rather new development, and its use has not been extensive, but it seems to be applicable everywhere that alfalfa grows.

The alfalfa flaming outfits are equipped with long booms which carry multiple burners. They consume large amounts of fuel—between 400 and 500 gallons per working day. The operating period is about two months long, beginning early in the spring just as the winter heating load is tapering off. In the alfalfa producing areas of California, where most of the flaming outfits now in use are located, annual consumption for the



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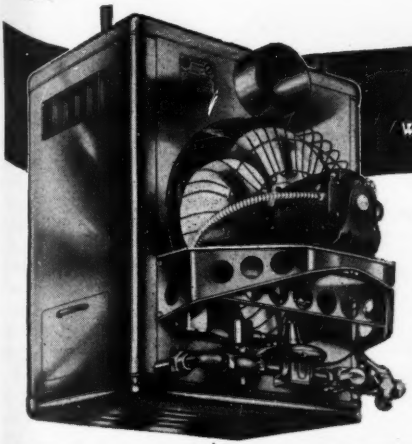

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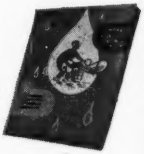

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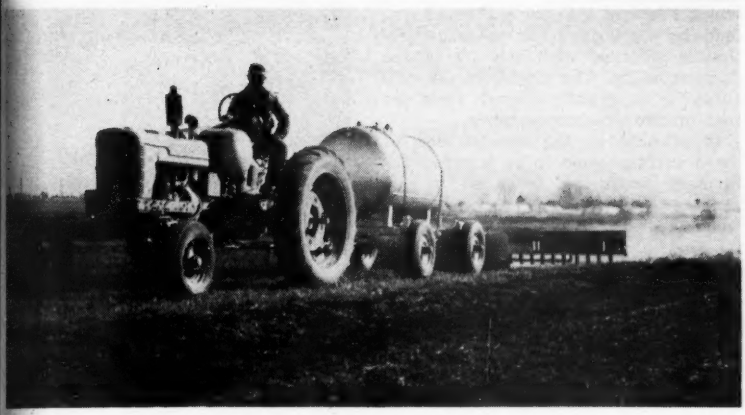


A multiple burner flaming rig for insect and weed control of alfalfa.

units which are kept busy amounts to approximately 20,000 gallons each.

The flaming outfit is not available commercially, but the construction is simple. Any operator can make it up, either in his own shop or with the help of the local welder. Blueprints may be obtained from Lancaster Gas Co., Lancaster, Calif., which developed the unit. Construction cost, including the trailer mounted tank, will range between $675 and $1000, depending on the amount of outside help necessary for welding and fabrication.

Flaming alfalfa fields was developed primarily for control of the alfalfa aphid. Early in the season, before active growth starts, these insects are living on the leaves and buds of the plants which remain from the previous season's growth. In passing the flamer over the field, the alfalfa plants are thoroughly singed, causing the top growth to be killed to the ground. Any aphids which escape death from the heat starve before new growth reappears from below the ground. The flaming kills any early weeds which have started up, and many seeds lying on the surface are also burned.

The burning of the alfalfa tops seems to stimulate more prolific sprouting, as well as root growth, which results in greater production. Since the first cutting is free from the customary mustard, pigweed, and other annual weeds which generally reduce the value of the hay, the income is higher. In most cases this is more than enough to cover the cost of the flaming operation. In irrigated fields there is a second saving due to the fact that with the stubble and trash burned clean, the water goes through the field faster, requiring less water to secure proper penetration throughout the vats.

Flaming a second time following the first cutting offers partial control of sand-burs and foxtail grass, and almost complete control of dodder.

The cost of flaming, compared with chemical sprays, offers a worth-while saving. It is necessary to use different chemicals for insects and for weeds,

which requires two trips through the field to accomplish the same control that is obtained with one trip of the flaming outfit. Chemical cost on each spraying is slightly higher than the cost of propane for burning.

Investment in the construction of these outfits seems to be justified for farmers producing from 80 to 100 acres of alfalfa, but most of those who own them do custom operation for their neighbors, or rent the outfits out. Rental at $1 per acre is a profitable deal for both the owner and the user. The capacity of a machine is from 1800 to 2500 acres per year.

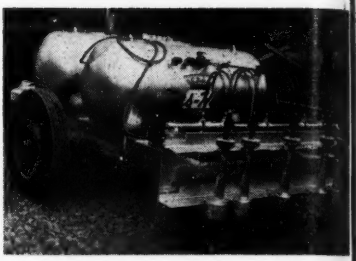
• Flaming Strawberries, Onions

STRAWBERRY mites and onion thrips live down in the leaf sheaths of the plants, where they cannot be reached by sprays or dusts. Infestations of these pests occur in most of the major producing areas of both plants. The most successful and economical method of control is by flaming with tractor-drawn machines. Such machines are now being produced by Ransome Co., Emeryville, Calif.

In controlling strawberry mites, last year's plants are burned to the ground just before new growth starts from the roots in the spring. The heat kills the mites. Production is greatly increased due to the elimination of the pests at the start of the season.

Mites are wind-borne, and may reinfest the plot from other infested fields, or from insects harbored by wild plants which are alternate hosts for the mites. This makes it necessary to repeat the burning each year. A single flaming machine covers more ground and does a cleaner job of control than a dozen or more hand workers using knives. Production of berries is greatly increased.

Onion thrips are being controlled



An Oregon dealer designed this strawberry flaming machine. It consumes about 12 gals. of propane an hour.

by flaming the plants severely enough to wilt them to the ground about the time the stalks are as large as a wooden pencil. If flamed at an earlier stage, the plants are injured and the crop reduced. By burning at the stated stage of growth, the plants develop additional roots, and produce larger onions and a heavier crop.

Early weeds are killed in both of these operations, thereby saving additional labor.

• Weed Clearing

THE use of propane torches and burners for the removal of weeds is practiced in many places, both on the farm, in industry, and in municipalities. Clearing weeds from fencerows, roadways, ditches, and fringe areas from which seeds may spread to cultivated fields is an effective means of protecting crop land against infestation.

Large sums are spent each year for spray oils and chemicals to kill weeds along highway borders and rights-of-way. In many cases these operations may be done more thoroughly or more economically by burning with propane.

In some localities the marginal

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growth along irrigating canals is being burned to prevent encroachment on the waterways, and to reduce the infestation of fields by weed seeds which drop into the water.

In addition to these rural applications, removal of weeds from parkways, vacant lots, industrial tracts, and various other locations in cities and towns offers considerable opportunity for the use of propane burning equipment. One small town in the West uses from 10 to 15 100-lb. cylinders per month during the summer for clearing weeds from the areas for which the city is responsible.

The potential market for propane for these purposes is obviously almost universal.

Equipment ranges from small cylinders carried on back-packs, connected by hose to long handled single burners, to domestic size tanks mounted on trailers, trucks, railway cars, which supply multiple burners mounted on booms of several large burners each handled by workmen.

Small scale demonstrations of the effectiveness of this method of weed clearing can be made with a burner attached by hose to any small container, such as a house trailer bottle or a standard cylinder. No particular engineering is required except for the large multiple burner units.

• De-Spining Cactus

PRICKLY pear cactus has invaded pasture land in many of the cattle growing areas of the Southwest, and West. With its natural thorns, it merely takes up land which might otherwise provide grazing. With the spines burned off, it makes valuable cattle feed, which is available during seasons that are too dry to provide pasturage.

Burning cactus spines may provide an outlet for propane at any time of year, depending on the absence of normal rainfall, or regularly during the normally dry season.

Equipment consists of back-pack outfits for extremely rough terrain, or cylinders or tanks mounted on tractors or jeeps for pasture land which these vehicles can negotiate, plus the necessary hoses and burners.

While this application is limited geographically, in some places the size of the individual ranch operations are very large. One propane distributor in Texas is reported to be supplying as much as 200,000 gallons per year for cactus burning. One rancher uses several fuel trucks to supply the gas for the various burning crews in his pastures.

A large torch on a long handle, supplied by a long hose from a cylinder, will make a very effective and dramatic demonstation, providing tons of feed available in a very short time.

• Small-Scale Flame Weeding

FLAME weeding can be carried on with almost any crop, and on almost any scale. Probably the smallest units in commercial service are the back-pack outfits used by the Easter lily bulb growers along the coast of northern California and southern Oregon.

The back-pack outfit, with a short hose and long handled torch, is very practical in the small fields of an acre or less. Larger fields can profitably use a hand truck outfit with a trailer bottle and a few extra feet of hose.

Use of similar outfits could be a great help in nurseries and home gardens. No dealer will ever get rich on the gas that they consume, but each one helps a little to build up summer volume, and the equipment sale can add a modest profit.

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7500 East 12th Street Kansas City 3, Missouri

Dairy and Livestock

SUPPLYING fuel for the dairy and livestock industries is possible almost anywhere. Every dairy requires hot water. For the small farm operator who may be milking only a few cows, a domestic water heater is sufficient, but the larger plants require boilers for the hot water supply.

The large Grade A dairies also require steam for sterilization and those delivering pasteurized milk and Grade A milk require refrigeration.

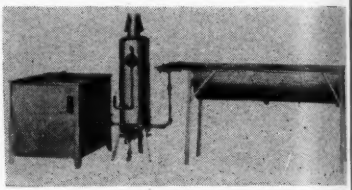
Competitively the dairy industry is one of the easiest markets to sell. Electricity is too expensive for heating water and is almost a total loss for producing steam. Neither coal nor oil can compete for cleanliness and convenience, and when the labor cost involved in the operation is considered, neither can equal the low cost of gas. Most of the major heat requirements in the dairying industry are on a constant year-round basis, although a few are seasonal, coinciding with the domestic heating load.

In the livestock industry the heat requirements are more likely to be on the seasonal basis with the peak coming during the same months as the winter domestic heating load.

• Dairying

STUDY of the operations of a single milk-producing and distributing plant shows a range of 13 different operations for which heat, refrigeration, and power may all be produced economically and conveniently through the use of propane. These operations are:

1. Washing cows with warm water preparatory to milking.
2. Heating milking room, if needed.
3. Washing and sterilizing teat cups of milking machines when changing from cow to cow.
4. Washing and sterilizing entire milking machine following completion of milking.

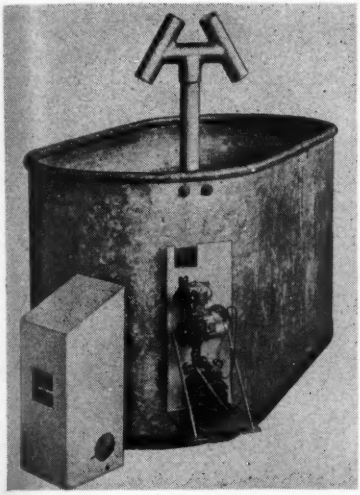


Sterilizing equipment for a milk house.

5. Compressing refrigerant by propane-powered engine.
6. Refrigerating aerating coils.
7. Refrigerating storage room.
8. Making ice for "en route cooling" of loads.
9. Sterilizing aerators.
10. Washing bottles.
11. Sterilizing bottles.
12. Pasteurizing milk.
13. Operating delivery trucks on propane.

• Stock Water Heating

IT IS now definitely established that supplying cattle, hogs, and other livestock with heated water during



Johnson stock tank heater with automatic controls.

the cold winter months enables meat animals to put on weight faster and dairy animals to produce more milk.

There are two reasons for this, the first being that when water is uncomfortably cold animals do not ordinarily drink an adequate amount to keep their bodily functions at top efficiency. The other reason is that in taking cold water into the stomach a considerable portion of the heat value of the animal's food is consumed in bringing the water up to body temperature.

Heating water for the animals will therefore encourage them to drink more water and permit more of the nutrient value of the food to go into the normal processes of producing growth or milk.

Extensive experimentation has shown that in the colder climates animals supplied with heated water will produce up to 10% more meat or milk and they will do it on less feed.

The use of L.P. gas-fired heaters is practical in any location whether it be in dairy lots, fattening pens, or on the range, because the gas may be supplied from either a bulk storage plant or transported in cylinders.

The burners may be installed under water and with thermostatic controls and with proper venting; they will not blow out even during the wildest blizzards.

• Heating Animal Shelters

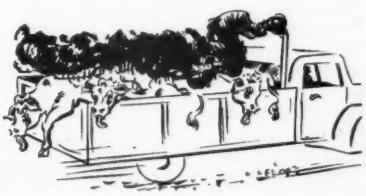
IN raising hogs and sheep in northern latitudes farmers are finding a distinct advantage in improving the survival and growth rates of early born animals by providing shelters with heated floors and offering protection from cold winds.

In some instances reports state that the heating of farrowing houses and lambing sheds has resulted in a saving of feed for the mothers which has paid for the cost of the heating.

The most satisfactory method of heating these buildings is by means of hot water pipes imbedded in concrete floors. Of course propane is the ideal fuel.

• Transporting Livestock

THE transportation of livestock is a big industry in the cattle-growing areas. In the West and Southwest,



particularly, many animals are moved over long distances, generally in diesel-powered trucks.

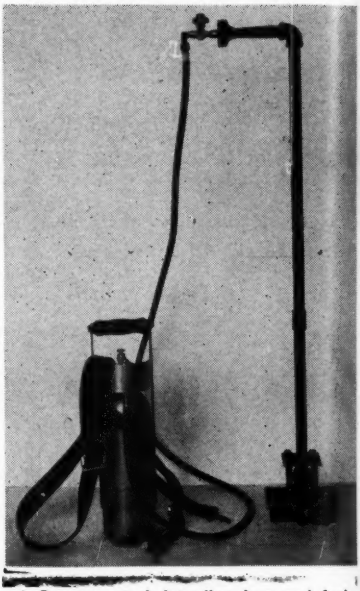
This is economical for the truck operator but offers definite disadvantages to the owners of the stock. Diesel fumes blowing into the air which the animals breathe tend to sicken them, causing them to lose weight and impairing their appetites so they do not resume normal feeding at the end of the journey.

The diesel soot, and to some extent unburned oil, are likewise deposited in the hair, which in the case of sheep, impairs the value of the wool. The extent of this contamination will be clear if you have ever driven up a long grade behind a diesel truck which was pouring out quantities of black smoke. It is quite common for the car's windshield to become densely speckled with drops of oil and the finish to become clouded with oil and soot.

The exhaust of a propane truck engine is completely clean and free from any such damaging effects on the livestock. Conversion equipment for changing diesel engines to propane operation has been developed and is now coming on the market. (See "Diesel Conversion" in the Power Section of this issue.)

• Branding

WHILE L.P. gas-heated branding irons will never provide a major fuel load for a propane distributor, they offer very great advantages for the cattle man. They can be kept at a constant controlled temperature at the correct heat to impose the brand without overburning and thereby damaging the hide and reducing its value for leather.



A Ransome stock branding iron and fuel cylinder.

The fuel is carried in a small reservoir in the handle of the torch and by means of an adjustable valve the burner may be operated to maintain the branding iron at exactly the right temperature.

The gas-heated branding iron also affords a big saving in time as it is not necessary for the crew to spend hours collecting and chopping wood. The iron is always ready for use as it does not require reheating to prepare for branding the next animal.

CITIES FUEL RE-ORDERS
SUPERIOR INTEGRAL TANK-TRAILERS

Bill Timmings, president of Cities Fuel of Fresno, California, has been among the first to re-order this new type unit that eliminates the frame and has the axles, wheels and springs attached directly to the ends of the tank.

This notable advancement has been specifically designed by SUPERIOR for use in California and the entire West Coast. SUPERIOR INTEGRAL gives a bigger payload with less operating cost by providing at least 160 more payload gallons with the elimination of 700 to 1100 pounds of excess dead weight. An 8 to 10 inch lowered center of gravity gives easier handling and towing characteristics.

Operators up and down the Coast, and inland, too, are ordering SUPERIOR INTEGRALS to replace outmoded equipment. In order to serve YOU promptly we have—

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Poultry

THE incubation and brooding of chickens and turkeys are carried on over a large part of the country and they provide a substantial market for L.P. gas.

From the standpoint of seasonal deliveries, they tend to unbalance the load as the season of greatest need for heat in these undertakings coincides with the domestic heating season. They do, however, offer the advantage of large consumption which makes economical deliveries possible.

In localities, like the New England states, where little heating is done with propane, poultry brooding offers a needed winter load to offset the heavy summer demand in recreation camps and resorts.

Other uses for L.P. gas in the poultry industry requiring less fuel provide a year-round market.

• Brooding

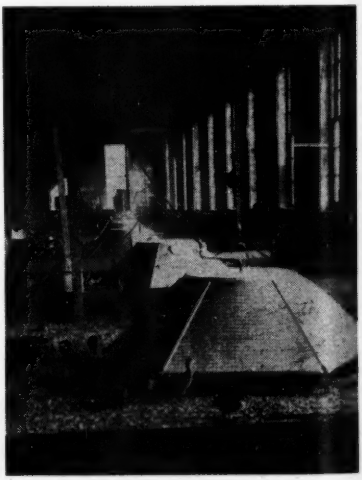
RAISING meat chickens for broilers and fryers is a year-round business. The heavy fuel load for brooding comes during the late fall, winter, and early spring, although a small amount is required in starting the summer broods.

Turkeys are generally late in the winter and through the spring, and their production offers no market for brooding fuel at other seasons.

A type of brooding which has gained wide acceptance is the "cold room" method, using canopy type heaters which provide shelter and warmth to which the birds go when they wish to get warm or sleep. At other times, they may wander out from under the heated canopy to eat, drink, or exercise. This corresponds rather closely to the natural method of brooding with mother hens or turkeys.

Proponents of the cold room method of brooding claim that the birds raised under this system are healthier, subject to lower mortality rate, feather out earlier, and have a more attractive appearance after dressing, because of more complete absence of pin feathers.

One variation of the cold room method is, instead of using special canopy type heaters with burners in the peaks, hot water pipes are laid in concrete slabs on the floor of the brooder house, and supplied with heat



A typical "cold room" poultry setup in which Wood brooders are used.

Make Three Sales in One with This Water Heater

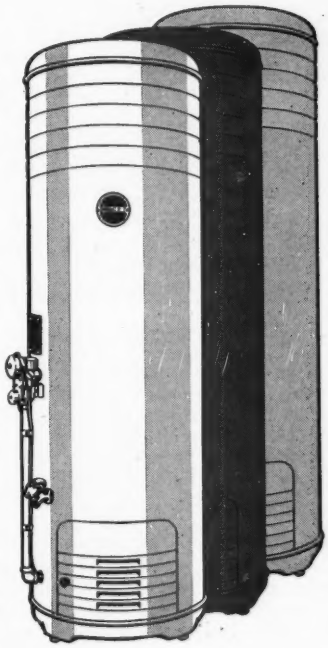
When you install a Duo-Therm water heater, you make three profitable sales:

1. You sell a quality appliance at a good profit.
2. You help build your fuel load on a year 'round basis.
3. You sell an appliance which helps build satisfaction with every phase of your service.

How? See what Duo-Therm offers:

- Exclusive Equaflame Burner, simple, rugged, trouble-free.
- Spun-glass insulation and insulated double base.
- Long, trouble-free life—with a zinc-lined tank.
- Finest automatic temperature control on the market.
- The right capacity for any home or commercial installation—20, 30 and 45-gallon models.
- A LIBERAL WARRANTY AND 10-YEAR CUSTOMER PROTECTION PLAN.

That's why we suggest you build your load with Duo-Therm—the water heater sure to keep a customer sold—on the satisfaction it provides and on the man who installed it. Write for complete information.



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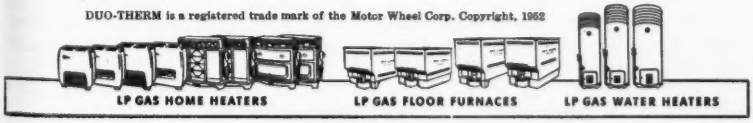
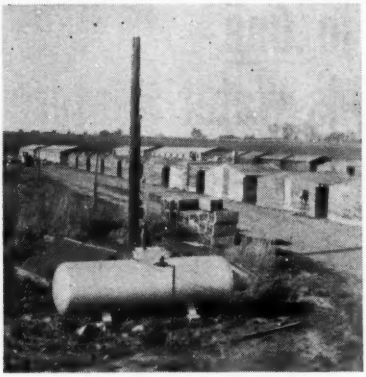


LP GAS HOME HEATERS LP GAS FLOOR FURNACES LP GAS WATER HEATERS



One of three propane storage tanks which supply burners in a large turkey brooding plant at Prosser, Wash.

from a boiler. Suspended canopies over the heated section of the floor confine the heat so some of the characteristics of cold room brooding are retained, but the installation is simplified, and maintenance of multiple heater units is avoided. The investment is higher than with the individual brooder type, but labor of cleaning and maintenance is reduced, and it is claimed that fuel costs are likewise reduced.

A contrasting system of brooding, known as the "hot room" method, consists of heating the entire brooder house with space heaters. These may be set on the floor, or suspended from the ceiling. From the investment standpoint, this is the simplest and most inexpensive system to install. Since the whole room is heated instead of a limited area, the fuel costs are higher.

Gas heat has definitely proved to be the best, most economical, and safest fuel for brooding. The heat control is completely automatic, and the range of control extends from full volume to completely off except for the pilot light. This is not possible with oil heat. The characteristics of oil burners are such that they can not be throttled down low enough to reduce the temperature to the proper degree for a day of moderate warmth. This makes it necessary to keep a man on duty controlling the brooder house ventilation to get the correct temperature, and a great deal of heat is unnecessarily wasted.

Disadvantages of Oil

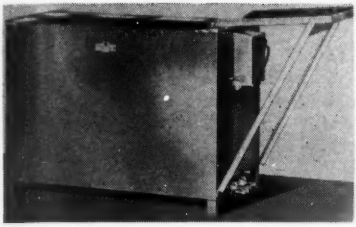
The oil heaters must also be vented, which results in a further heat loss. There is also the danger of having the fire blown out, or blown into the litter, during a windstorm. The hazard makes it necessary to patrol the brooder house day and night during bad weather—a condition which is completely avoided when using gas brooders. For these reasons, gas brooding is more economical in fuel cost and in labor cost.

Extensive experiments have been made with infra-red electrical heating for brooding of poultry, and some commercial use is made of this method. It is more expensive than L. P. gas in most cases, and even the Rural Electrification Administration admits that it has disadvantages, including those resulting from power failures.

• Poultry Dressing Plants

MANY growers of meat chickens and turkeys do their own slaughtering and dressing. This requires large amounts of hot water for scalding.

Boilers supplying these plants are frequently fired by oil or even by wood or coal, in any case requiring considerable attention. They may be re-equipped with thermostatically controlled propane burners which require no attention at all, as they supply hot water in exactly the same way as a domestic water heater.



Pickwick poultry scalding vat.

After the birds are picked, it is customary to singe them to remove all hair-like growths and give them improved appearance for marketing. Propane hand torches are used for this.

• Insect Control, Disinfecting

LICE and mites in poultry houses may be controlled by flaming the walls, roofs, and floors with a propane torch.

This treatment is given in a great many broiler plants every time a batch of poultry is moved out, as a part of the cleanup work preparatory to starting a new brood. Many operators claim it is as effective as spraying and considerably less expensive.

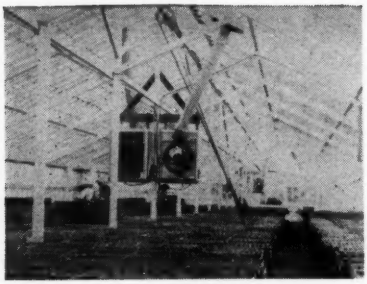
This new style Ransome torch is ideal for insect control in poultry houses.

Satisfactory experimental work has been completed in the disinfection of litters in houses and yards where outbreaks of coccidosis have taken place.

Miscellaneous

• Greenhouse Heating

A GREAT many large commercial greenhouses and an increasing number of small private greenhouses are being heated with L.P. gas. The heating method is generally one of three types: (1) Circulation of hot water from a boiler through pipes



Commercial greenhouse with propane suspended heater.

laid in the concrete floor. (2) Installation of radiator-type heaters immediately above the floor. (3) Overhead type space heating equipment such as is used in factories and shops.

The heat load in greenhouses coincides with the domestic heating requirements. Consequently, it tends to add to the gas distributor's winter unbalance. The volume offered is exceptionally good, however, because of the high heat loss through the glass.

• Produce Truck Heaters

HEATERS specially designed to maintain favorable temperatures in trucks and freight cars carrying perishable agricultural produce to market through frigid weather are coming into increased use on highways and railways.

Incorporating thermostatic control and pilot burner, the heater will operate continuously for from 80 to 240 hours on 100 lbs. of fuel.

Commercial house size cylinders are used in the railway installations, but most of the cargo truck heaters are supplied with two 20-lb. trailer bottles which provide sufficient fuel for 40 hours under maximum heat requirements.

• Orchard Heating

FROST protection in orchards is quite important in certain limited areas both for the protection of trees bearing in winter and such as citrus fruit and avocados, and for deciduous orchards during the blooming season, when a hard freeze would be likely to wipe out a year's crop.

An LPG burner system operating on propane piped through the orchards is available. Its installation cost is somewhat higher than the investment in individual oil-fired heaters, but over the years it offers a great advantage in saving of labor and freedom from smoke ("smudge"), as well.

Oil heaters must be refilled by hand,

Orchard heater developed by American Liquid Gas Corp.

and they burn at only one rate—full capacity. Gas heaters never need to be filled, and the entire orchard heating system may be controlled from a central valve to get any amount of heat which may be required. With thermostatic control, a farmer may light his heaters, go to bed, and sleep in peace.

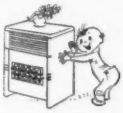
DVRCK-65

it's TOUCH-COOL for *Hot* sales!

the great NEW

Dearborn® Guard-O-Matic

GAS AREA HEATER



the *Only* vented, radiant, circulating heater with TOUCH-COOL cabinet

DVRCK-45

DVRCK-30

Sensational is the word for this new Dearborn Guard-O-Matic—series DVRCK!

Available in three popular sizes, it's the *only* vented, radiant, circulating gas heater on the market with remarkable *Touch-Cool* cabinet! So C-O-O-L even plants can be grown on top! Never, never hot on top, bottom or sides. Can't possibly harm furniture, rugs, drapes or walls. *Can't harm inquisitive little fingers!*

That's a sales feature that really *means* something! And when you back it up with all the other fine Dearborn features, you know why Dearborn is America's most wanted gas area heater.

DEARBORN—YOUR BEST BET FOR SALES, FOR PROFIT!

COMPARE! ONLY DEARBORN GIVES YOU ALL THESE FAST-SELLING FEATURES!

- **Touch-Cool cabinet—top, bottom, sides never hot!**
- **Black Magic convector—for positive air circulation, even temperature.**
- **Famous High-Crown burner—gets more heat from fuel for greater economy.**
- **Glo-Brite radiants—for more efficient combustion, more radiant heat.**
- **Automatic lighting with 100% safety pilot.**
- **Automatic controls—choice of 4 types for most convenient operation.**

AGA APPROVED FOR ALL TYPES OF GAS.

Write today for your copy of "THE STORY OF AREA HEAT"!

Dearborn®

STOVE COMPANY

CHICAGO: 5830 N. Pulaski • DALLAS: 1700 W. Commerce St.

PRODUCTS

Domestic Range

PREMIER STOVE CO.
Belleville, Ill.

Model: B-25

Description: This space-saving range, which requires only 30 in. x 26 in. of floor space, has flush-to-wall construction with recessed toe-plate. Work space is provided between the divided burners, which consist of two large burners for large-vessel cooking and two smaller burners for economical cooking.

The Fiberglas insulated oven which has nearly 7500 cu. in. of baking capacity has two heavy duty non-tilt racks; a Robertshaw thermostat controls the oven heat. The oversize broiler pan, in a pull-out drawer with drop front, has a basting well for draining fats.

The range, which bears the AGA seal of approval, has an acid resisting Titanium porcelain enamel finish and a shipping weight of 208 lbs.

Water Heater

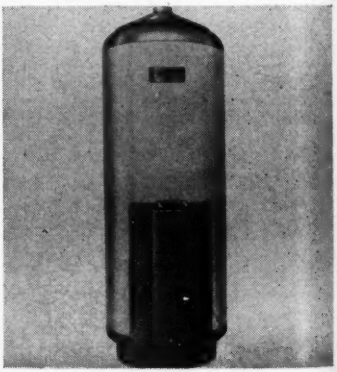
TRAGESER COPPER WORKS, INC.
Maspeth 78, N. Y.

Model: Copper Core

Description: Surrounded by a heavy gauge steel wall, the copper tank of this heater is insulated with Fiberglas and has an outside baked enamel shell. The water tank and the flue, which carries the gases of combustion, are made entirely of pure unalloyed copper.

The mechanical design of the unit conceals all working parts, but they are immediately accessible on removal of the pull-out coverplate. The combustion chamber is planned to furnish a deep sludge well and to insure minimum impairment of heating efficiency, even if sludge draining is neglected long periods.

The AGA approved heater is made in 30, 45, 60, and 80-gallon sizes. Hourly recovery capacities (at 100° temp. rise): 21.8; 29.4; 35.3; 43.7 gals.

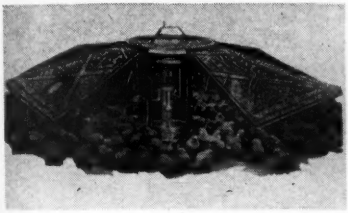


Brooder

OAKES MANUFACTURING CO.
Tipton, Ind.

Model: Drum-Type Gas Brooder

Application: Designed especially for broiler raisers and for poultrymen desiring to brood chicks in groups of 750 to 1000.



Description: This unit has a heavy cast iron burner with a capacity of 15,000 Btu per hour. The 22-in. diameter heat deflector has 1-in. of Fiberglas "aerocor" insulation. An automatic regulator is easily accessable through a hand hole at the edge of the canopy.

Air movement and the elimination of moisture condensation is obtained by a 1½ in. clearance for circulation between the heat radiating drum and the insulated canopy. A fully enclosed 2-way pilot and burner prevent fire hazard.

Crop Dryer

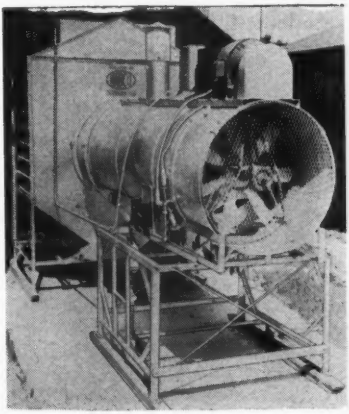
HABCO MANUFACTURING CO.
Columbus, Neb.

Model: Jet Dri

Application: For drying corn, wheat, beans, sorghums, hays, oats, grains, rice, peanuts, etc.

Description: The jet burner is contained in an aluminized steel and stainless steel heat exchanger which furnishes indirect heat for safe and economical operation. The burner utilizes a cheaper fuel with a higher combustion rate. The heater unit operates either with moderately high or low temperatures as required with high air volume. Additional features are the propeller type fan and a heat exchanger system, which provides large volumes of soot-free, fume-free air at safe, controlled temperatures.

The amount of heat developed for the four portable models manufactured ranges from 120,000 Btu per hour to 1,000,000 Btu.



Regulator

NATIONAL CARBURETION CO.
Shawnee, Okla.

Model: 500

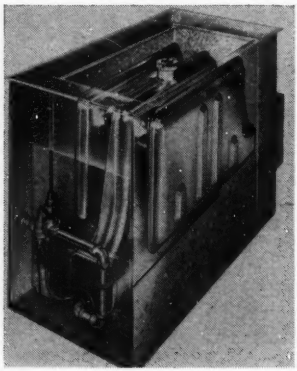
Description: the National Model 500 regulator is a 2-stage, liquid inlet type with a capacity up to 350 hp. The fuel outlet consists of a ¾ in. tube to the carburetor and the water lines are constructed of ⅝ in. heater hose. The secondary outlet pressure, which is slightly above atmospheric, is regulated by idle adjustment.

The fuel lock, located at the fuel inlet, is electric. A balance tube is required only if the air cleaner provides unusual or variable restriction.

Floor Furnace

LAWSON MANUFACTURING CO.
Pittsburgh, Pa.

Model: "C"



Description: All connection fittings and controls are enclosed in a wide compartment of the outer casing, making all parts accessible from the floor level. With ample room for the use of tools, the gas line union connection can be disconnected from the floor level and the entire assembly of controls, burner and heat exchanger lifted out for inspection and adjustment.

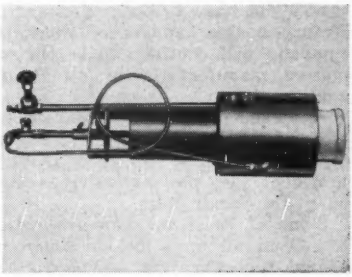
Another feature of the furnace is the heat exchanger with an enclosed combustion chamber combined into a single, heavy, durable, seam-welded unit. The combustion chamber encloses the burner, preventing combustion gases from entering the air stream, and assures uniform firing under all conditions.

Model "C" is available in three sizes: 35,000, 50,000, and 65,000 Btu.

Industrial Burner

MUTUAL LIQUID GAS EQUIPMENT CO.
Inglewood, Calif.

Model: LVB



Application: For medium to heavy duty industrial uses.

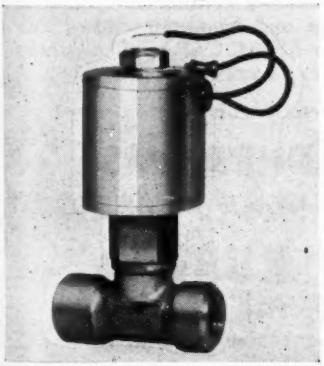
Description: This model, which is available with either a 2-in. or 6-in. burner head, features ease of handling and maneuverability. It has no moving parts and utilizes liquid gas direct from the tank. It is a self-generating liquid vaporizer burner; a needle valve controls the gas, which passes into a jacketed chamber enclosing the burner, where it is pre-heated and vaporized, and then to a gas-air mixer within the burner. No additional vaporizer is required. Close temperature control can be accomplished by using automatic control devices which are available on the market.

The LVB2 has a rated capacity of 280,000 Btu per hour, weighs 7 lb., and measures 25 in., while the LVB6 has a capacity of 3,500,000 Btu per hour, weighs 65 lb., and measures 36 in. overall.

Solenoid Valve

BEAM PRODUCTS MANUFACTURING CO.
Los Angele 21, Calif.

Model: Lockoff LS622



Application: For preventing leakage of fuel; as a remote control shutoff for stationary engines; or as a means for switching from gasoline to LPG.

Description: No castings are used in the valve, which is constructed of brass forgings. All steel parts are cadmium plated. The stainless steel plunger has a neoprene seat which is vulcanized in solidly to insure a perfect seal at low and high pressures. The valve has a large orifice and operates on a safety factor that allows it to open well in excess of maximum operating pressures.

This model must be energized by turning on the ignition switch and consequently stops leakage the instant fuel is not being used. It is available in 6 volt and 12 volt D. C.

Gasair Equipment Made Exclusively by Binn's

Edward J. Pagendarm, president of Binn's Machine & Tool Works, San Francisco, has announced that his company will continue to be the exclusive manufacturer of all Gasair equipment.

A second organization—Gasair Associates—also headed by Mr. Pagendarm, with Willis S. Yard as vice-president, is the exclusive selling agent for Gasair units.

Some of the firms now franchised to sell Gasair units include American Liquid Gas Corp. in southern California, Butane Gas & Appliance Co. in the Midwest, Drake & Townsend Inc. and the Pacific Gas Corp. in the East.

The construction of new factory and office facilities at Redwood City, just south of San Francisco, will begin immediately, according to Mr. Pagendarm. The plant will cover 25,000 sq. ft. and will feature the latest in modern production machinery. Completion of the plant is scheduled for early fall.

H. F. Miller Passes Away From Heart Attack

Herbert F. Miller, who retired from the Carter Oil Co. last February, died of a heart attack in Tulsa last month. He was 66.

Mr. Miller had been with Carter and other Esso Standard Oil affiliates for 48 years and at the time of his retirement was vice president in charge of crude oil purchasing and L. P. gas production for sales.

METERED L P GAS IS GOOD BUSINESS!

Tank and meter delivery builds customer confidence . . . saves unnecessary trips and their mileage and man-hour costs. Tank and meter installations give the user MORE CAPACITY — help you sell more fuel by selling more appliances.

When you install meters, insist on

VULCAN DIAPHRAGMS

for accurate metering and trouble-free long service life.

VULCAN RUBBER PRODUCTS, INC.

58TH STREET AND FIRST AVENUE, BROOKLYN 20, N. Y.

Engine Fuel Sales Gain

THE official national sales totals of L. P. gas for 1951 have been released by the U. S. Bureau of Mines. They reveal that sales of butane and propane in the U. S. in 1951 were 4,227,275,000 gallons, a gain of 21.4% over 1950.

Total sales for the domestic market showed 51.2% of the whole, a gain of 7.1% over 1950. This apparently low gain as compared with total sales is largely due to the fact that the sales reports received by the Bureau of Mines were from a far greater total of dealers throughout the country as compared to 1950 reports. These dealers are in closer contact with consumers and are in a much better position to break down deliveries of fuel for internal combustion engine uses. This diverted quantities which in prior years had been included under "domestic" to the proper "internal combustion" column.

Internal combustion engine fuel more than doubled in 1951 as compared to 1950. It is now the second largest dealer market for butane-propane (synthetic rubber and chemical uses are not dealer markets).

Table 1 shows a breakdown of the fuel used by various segments of the industry. The state-by-state sales will be published in the October issue of BUTANE-PROPANE *News*.

ABLE 1—SALES OF L. P. GASES IN U. S. OVER SIX-YEAR PERIOD
(In Millions of Gallons)

Year	Total Sales	% Gain	Dom.	% Total	% Gain	Engine Fuel	% Total	% Gain
1946	1,704.3	33.5	758.5	44.5	42.1	94.6	5.6	1.2
1947	2,209.8	29.7	1,150.5	52.1	51.8	99.8	4.5	5.2
1948	2,736.8	23.8	1,473.3	53.8	28.1	92.9	3.4	− 6.9
1949	2,836.6	3.6	1,627.5	57.4	10.2	78.0	2.7	−16.1
1950	3,482.6	22.8	2,022.5	58.1	24.3	129.8	3.7	66.8
1951	4,227.3	21.4	2,166.8	51.2	7.1	290.0	6.8	123.4

Gas Mfg.	% Total	% Gain	Year	Indust.	% Total	% Gain	Chemical & Syn. Rub.	% Total	% Gain
86.7	5.1	60.8	1946	159.1	9.3	−2.5	605.4	35.5	39.8
169.3	4.5	90.5	1947	173.6	7.9	9.0	615.8	27.8	1.8
237.6	3.4	40.0	1948	180.5	6.6	4.0	750.0	27.4	21.8
239.2	2.7	.8	1949	162.2	5.7	−4.6	722.7	25.5	−3.6
251.7	3.7	5.2	1950	217.1	6.2	33.7	852.9	24.5	18.0
281.7	6.8	11.9	1951	262.1	6.2	20.7	1,219.4	28.9	42.8

SEPTEMBER

5-7—WISCONSIN L. P. GAS ASSN. FALL MEETING. Red Arrow Lodge, Tomahawk, Wis.

11-12—LPGA Board of Directors meeting. Hotel Nicollet, Minneapolis, Minn.

14-16—New Mexico Liquefied Petroleum Gas Assn. Hilton Hotel, Albuquerque, N.M.

15-16—Virginia L. P. Gas Assn. Annual Convention. Natural Bridge, Va.

19-20—NORTH AND SOUTH CAROLINA L. P. GAS Assns. Joint Meeting. Grove Park Inn, Asheville, N.C.

20-21—NEVADA L. P. GAS ASSOCIATION. Mizpah Hotel, Tonopah, Nev.

22-23—IOWA L. P. GAS ASSN. ANNUAL CONVENTION. Savery hotel, Des Moines, Iowa.

29-30—UTAH L. P. GAS ASSN. Fall Meeting. Salt Lake City.

OCTOBER

3-4—ILLINOIS L. P. GAS ASSN. St. Nicholas Hotel. Springfield.

6-8—ALABAMA L. P. GAS ASSN. Convention. Thomas Jefferson Hotel. Birmingham.

9-10—CALIFORNIA NATURAL GAS ASSN. Ambassador Hotel, Los Angeles.

12-18—OIL PROGRESS WEEK.

27-31—AMERICAN GAS ASSN. 34th Annual Convention. Atlantic City, N. J.

27-31—GAS APPLIANCE MANUFACTURERS ASSN. Exposition. Ambassador hotel, Auditorium, Atlantic City, N. J.

30 — NORTHEASTERN DISTRICT, LPGA. Ambassador Hotel. Atlantic City, N. J.

NOVEMBER

3—MINNESOTA PETROLEUM GAS ASSN. Hotel Nicollet, Minneapolis, Minn.

10-13 — AMERICAN PETROLEUM INSTITUTE. Annual meeting. Conrad Hilton and Palmer House hotel, Chicago.

19—AMERICAN STANDARDS ASSN. Waldorf-Astoria hotel, New York City.

DECEMBER

4-5—LPGA Board of Directors meeting. Jung Hotel, New Orleans, La.

1953

APRIL

19-21—MISSISSIPPI L. P. GAS DEALERS ASSN. Annual Convention. Edgewater Gulf hotel, Edgewater Park, Miss.

29-30-May 1—NGAA ANUUAL CONVENTION. Rice hotel, Houston, Texas.

MAY

20-22—GAS APPLIANCE MANUFACTURERS ASSN. Annual Meeting. The Greenbriar, White Sulphur Springs, W. Va.

JUNE

16-18—MISSOURI L. P. GAS ASSN. Annual Convention & Trade Show. New Jefferson hotel, St. Louis, Mo.

Among those attending the Michigan LPGA Midsummer meeting were (first row) W. W. Packard, Stan Baker, John Kelderhouse, and (second row) Vic Storey, Mike Goodman, Jim Gower.

Michigan Holds Summer Meeting

Cool weather and intermittent rain did not dampen the enthusiasm of the Michigan L. P. Gas Assn. members who attended the annual summer convention June 20-22 at Johnson's Rustic Resort, Houghton Lake, Mich.

The fishermen under the leadership of President Clarence Habermehl, fared poorly but prizes were distributed, one to a clam catcher who wishes to remain anonymous. Fred Weaver, Stampings, Inc., planned and conducted a fine golf tournament. There were 37 entries with 24 prizes and Fred proved he was capable by shooting a 74 for low medal score. Mrs. J. E. Kelderhouse was low scorer for the women's flight.

The principal speaker, Arthur J. Iverson, deputy attorney general of Michigan, discussed problems in the L. P. gas field similar to the problems confronting the state legislative group in other industries.

The business meeting discussion also covered the following topics: Use tax, road classification, factory built L. P. gas engines, and current legislative problems.

An address by President Frank Malan of the Illinois LPGA on "Why We Want to Be Neighbors," was also given.

THE QUICK WAY TO WATER HEATER SALES

- Advanced Design . . . for completely automatic operation.
- Fiberglas Insulation, both tops and sides . . . for efficiency and economy.
- Modest Initial Cost

The QUICK Automatic Water Heater has many of the features found in more expensive heaters . . . plus some advantages to be found in no other heater. It's the choice of wise buyers who want a thoroughly satisfactory and economical water heater. It has sales-building eye appeal, too.

SECURITY MFG. CO.
1630 Oakland Kansas City 3, Mo.

SECURITY

QUICK
AUTOMATIC
WATER HEATERS

LP GAS

TOM GIBBONS

Appointment of Tom Gibbons in a newly created position as director of marketing of the **Caloric Stove Corp.** is announced by Julius Klein, president.

Mr. Gibbons has resigned as advertising manager of Magic Chef, Inc., St. Louis, where he had been since February, 1946. He will work between the company's offices in Philadelphia and its executive offices and factory at Topton, Pa.

John A. (Jack) Love, of Shawnee, Okla., has formed a new company that will be known as the **National Carburetion Co.** The company will manufacture the well known National Carburetion system. Mr. Love purchased all manufacturing and patent rights, and also the inventory of L.P.G. Carburetion, Inc., of Houston, Texas. The Shawnee firm will manufacture motor fuel tanks, custom built tractor tanks, and other carburetion accessories in addition to their carburetion systems.

Mr. Love will also have with him capable and experienced engineers who have manufactured, serviced, and sold LPG carburetion for many years. The move from Houston to Shawnee was made in July. The company plans to adhere to a strict policy of service and individual assistance to all its customers.

Robert E. Maloney, president of **Calor Gas Co.**, announces that R. A. Hemingson has been appointed Central Valley division manager with headquarters at Fresno, Calif., and R. M. Bond becomes manager of the Rocky Mountain division with headquarters at Great Falls, Mont.

Mr. Hemingson has been with the Calor organization for the past three years, more recently as Rocky Mountain division manager.

Richard Bond comes from the Calor engineering staff main office in San Francisco. He has been with Calor since January in the capacity of field engineer.

The A. O. Smith Corp. is incorporating three methods to enlarge and streamline its activities in the heating field. These are the introduction of a line of warm air furnaces; the consolidation of the water heater and the heating divisions into a new Permaglas-heating division with headquarters at Kankakee, Ill.; and the transfer of the heating division's manufacturing facilities and marketing personnel from their present

location in Toledo to Kankakee. The officials of the Permaglas-heating division include F. S. Cornell, general manager; J. F. Donnelly, assistant manager; S. E. Wolkenheim, marketing director; J. S. Robinson, product manager; D. D. Williams, sales engineer; and Don A. LeRoy, sales promotion manager.

John J. Redmon has been appointed manager of the company's product service branch at Dallas, succeeding Ben Heald, who is returning to full time sales activity for A. O. Smith.

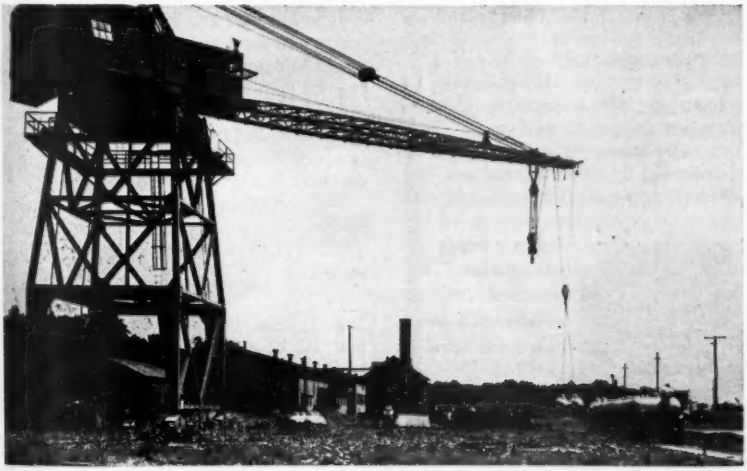
The headquarters for the firm's New England sales operations have been moved to Springfield, Mass., and will be under the direction of W. T. Halket.

A nationwide campaign to sell the public on the merits of its 1952 line of gas and electric absorption refrigerators by paying people to try them in their homes was launched today by **Servel, Inc.**

W. Paul Jones, president of the firm, said the campaign offers householders one dollar a day for trying out a 1952 Servel household refrigerator for 10 days. If at the end of that time the householder decides not to keep the refrigerator, it will be removed without charge and she will be given the ten dollars. Of course, she will also be given the money if she buys the refrigerator.

The unloading of the first barge load of tanks at their new Jeffersonville, Ind., terminal, is announced by officials of the **Delta Tank Manufacturing Co., Inc.**, of Baton Rouge, La.

J. E. Ketner, sales manager for Delta, says that this new terminal had been established to distribute



Giant arm of the huge Jeffersonville Boat and Machine Co. crane slowly lifts first barge load of Delta Manufacturing Co. tanks into position at that company's new Ohio terminal.

New appliance connections can be quickly fitted if threaded pipes have been sealed with Plastic Lead Seal. This all-purpose sealing compound never hardens—which means easy dis-assembly even after long service on underground or outdoor connections . . . insoluble in any petroleum or liquid gas service.

PLS seals effectively at temperatures to 550 deg. F., pressures to 4000 psi . . . permanently protects against dangerous and costly leaks . . . eliminates galling and rust . . . Approved by Underwriters' and Butane Propane Institute of Louisiana.

Try a sample at our expense. You'll standardize on it as so many bulk plant operations have.

JOHN CRANE
CRANE PACKING CO.
1838 CUYLER AVENUE, CHICAGO 13, ILL.
Offices in All Principal Cities in United States and Canada

tanks and cylinders to dealers in the Indiana, Illinois, Kentucky and Ohio areas. Delta's plans have pointed in this direction for sometime. This Jeffersonville terminal will be a pilot plant from which other river point terminals will be patterned.

Opening day for this new distributing center was held July 1 with members of the Jeffersonville Chamber of Commerce, headed by Robert Kempf, the terminal manager, Randolph Trebing, Al Williams and J. E. Ketner of the Baton Rouge plant, and Les Billings and J. A. Varnado sales representatives for Delta in the four state area.

The new Delta Terminal is located on the property of the Jeffersonville Boat & Machine Co.

The fourth issue of "Cylinder Tips" by **Pressed Steel Tank Co.**, Milwaukee, Wis., was mailed to industry members in early August.

It announces the 7-year and 12-year test periods for L. P. gas cylinders which became effective May 8 under the new Interstate Commerce Commission rule and details the two prescribed methods of testing so dealers can decide which is best for an individual operation.

Those wishing copies of these bulletins should address Pressed Steel Tank at 1445 South 66th St., Milwaukee.

B. C. (Bill) Robinson, Jr., has sold his interest in L.P.G. Carburetion, Inc. of Houston, Texas, with which he has been associated for the last three years, and has joined the **Century Gas Equipment Co.** of Lynwood, Calif.

Mr. Robinson will make his headquarters in Houston, Texas. He has been associated with the carburetor industry since 1938.

ANNOUNCING

A NEW PROGRESSIVE FIRM NOW SELLS THE PROVEN AND ACCEPTED

National Carburetion

COMPLETE STOCKS OF:

- ★ National Carburetion for all gas-gasoline engines.
- ★ Domestic, motor fuel, tractor custom-built tanks.
- ★ 20 #, 60 #, 100 # ICC cylinders.
- ★ L.P. fittings and regulators, valves.
- ★ Flare tube fittings and copper tubing.
- ★ Propane hose, L.P. pumps, all accessories.

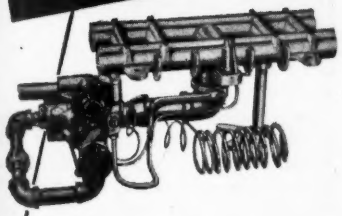
Write, wire or call us for your National Catalog today.
Contact our home office for available dealerships and distributorships.

THE COMPLETE LINE FOR BUTANE DEALERS

NATIONAL CARBURETION CO.

Box 3075 Shawnee, Okla. Phone 316

TOP PERFORMANCE



Model SP-45 Blue Flame Gas Log Conversion Range Burner fits any firebox, burns any type of gas. Quiet, efficient, automatic.

... and TOP PROFITS! You can increase your profits and insure customer satisfaction by selling Heatbath precision-built conversion gas burners — the finest available anywhere. Complete line for bungalow, combination and dual oven ranges and space heaters. Thermostatically controlled. Utility approved.

Write for full details, specifications and dealer possibilities now!

HEATBATH APPLIANCES

I N C

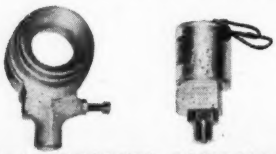
P. O. Box 78 Springfield, Mass.

built for the dealer
to satisfy the public

BEAM Carburetion

1. Instant Starting—no priming or choking required, regardless of weather.
2. Smooth Idle—that will not get out of adjustment. Motor will not die at stop signs.
3. More power—the Beam 400 regulator, weighing 5 lbs. and 6" in diameter, handles engines up to 325 h.p.
4. Simple Installation—just one dry-gas hose required. No idle plates or connections to make below the butterfly.
5. Dependable Operation—a result of advance design that eliminates troublesome parts.

Complete Kits available
Write or Wire today



LPG PRODUCTS COMPANY
P.O. Box 105-B • Kearney, Nebraska

W. T. TRUEBLOOD

Magic Chef, Inc., has announced the appointment of W. T. Trueblood, Jr., as director of advertising and promotion.

According to M. W. Pender, vice president in charge of sales, this is a newly created office to implement expanded sales activities, resulting from the development of new appliances to be marketed in 1953 and growing sales of the company's regular products.

Mr. Trueblood joined the company in May, 1948, and became sales promotion manager in August, 1949.

The resignation of O. T. Gibbons, advertising manager, is announced concurrently.

Magic Chef has also appointed W. D. Ryan manager of its Pacific sales division. He succeeds J. J. Edwards, who will assume new duties with the company's St. Louis headquarters in the near future.

Mr. Ryan, formerly Magic Chef sales representative in the Los Angeles area, will supervise distributor and dealer sales activity for all Magic Chef products throughout a six-state coastal area. His offices will be at Los Angeles.

Rex Falkner is the newest addition to the national sales staff of **William Wallace Co.,** manufacturers of "Metalbestos" gas vent pipe. He has been assigned to the company's Dallas office, headed by C. E. Blome, Midwest division manager.

Previous to assuming his present position, Mr. Falkner was sales manager for a heating supply firm in Dallas.

HARRY WISEMAN

Harry Wiseman, who has been manufacturer's representative for the Ruud water heater in the past, has joined the organization of **Southern Heater Co.**, New Orleans, as promotion manager. He will continue to specialize in the promotion of the Ruud water heater account, which has been represented by Southern Heater for many years.

The addition of two new offices and an increase of 30% in their tank car fleet have been made by **Anchor Petroleum Co.**, Tulsa, in keeping with the increasing demands for butane, propane and other petroleum products.

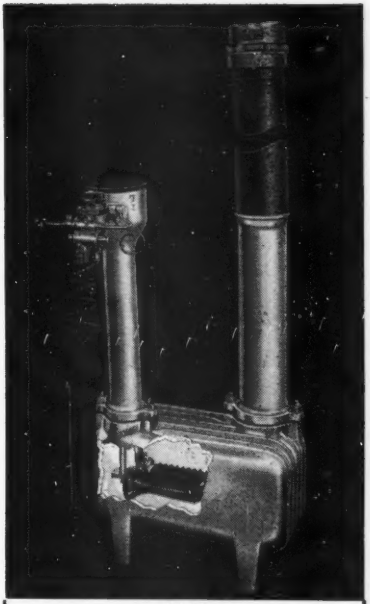
Anchor has recently opened new sales offices in Toledo, Ohio, and Houston, Texas. Manager of the Toledo office is Nicholas J. Biebel, sales manager, Anchor's Eastern division.

R. W. Leonard, district sales manager, Gulf coast area, is heading the new Houston office.

Main offices for Anchor are in Tulsa. Other sales offices are located at Des Moines, Iowa, Omaha, Nebraska, and Los Angeles.

Purchase of the stove and enameling assets of the business formerly conducted by **Grand Industries, Inc.**, of Cleveland, Ohio, is announced by the **Sunray Stove Co.** of Delaware, Ohio.

The sale was made by the Cleveland Hobbing Machine Co., the unit resulting from the recent merger of Cleveland Hobbing Machine Co. and Grand



Model 950-B

BLU-BLAZE

Stock Tank Heater

Vent pipe Weep Holes plus 3/16" thick cast construction eliminates condensate problem.

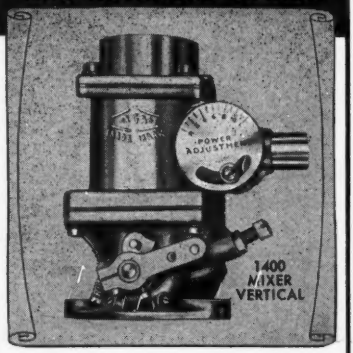
- Constant high efficiency assured by BLU-BLAZE Draft Cops.
- Efficient drilled port, cast iron, Venturi type burner—18,000 BTU Capacity—Factory installed and adjusted.
- Automatic controls optional.

Write for literature and prices

TESCO *Incorporated*

110 S. NORFOLK • TULSA, OKLA.

IMPROVED ENGINEERING AND ADVANCED DESIGN



Brings Greater Flexibility to ALGAS Carburetors

Pioneers in the LP-Gas Industry, ALGAS. is constantly improving their equipment to serve better the expanding needs of their field. Now ALGAS offers a new, improved design in their 1400 Series Mixers that greatly expands the flexibility of installation. Write today for information and specifications.

ALGAS

Specializes in Everything for Butane-Propane Industry • • • •

CARBURETION AND CONVERSION EQPMT
•
SERVICE STATIONS
•
STAND-BY PLANTS
•
FUEL DISTRIBUTION

AMERICAN LIQUID GAS CORPORATION
1109 Santa Fe Avenue
Los Angeles 21, California

Industries, Inc. The business consists primarily of the manufacture of domestic gas cooking appliances which for many years have been merchandised under the trade name "Grand."

George E. Mumma, president of Sunray, said the Cleveland plant will continue to operate and that Sunray management started Aug. 4. This will be Sunray's first plant outside of Delaware.

JOHN T. HASSEY

Neptune Meter Co. announces that John Thomas Hassey has joined its sales force. He will represent the company in the sale of petroleum meters in the New England territory, assisting Charles W. Krause, with headquarters at Boston.

Mr. Hassey is a graduate of the Massachusetts Institute of Technology, majoring in business and engineering administration. He was formerly employed as a field engineer with Cities Service Oil Co. and was employed by the Massachusetts Motor Truck Assn. as assistant manager.

The appointment of Robert W. Ayling as an additional development engineer on the engineering staff of **The Brunner Manufacturing Co.** at Utica, New York headquarters is announced by A. G. Zumbrun, Brunner president.

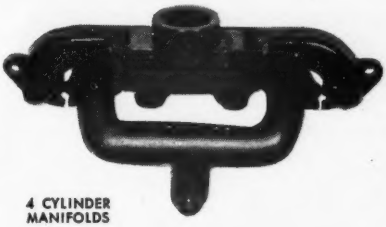
For the past five years Ayling has been connected with the Carrier Corporation in Syracuse in the capacity of Receiver and Compressor Engineer, resigning this post to go with the Brunner organization.

JOHNSON'S

HIGH COMPRESSION PISTONS
MANIFOLDS • PUMPS

Butane Manifolds for John Deere Models "G," "A," "B," "D"
Butane Manifolds for International "H" & "M"
Butane Manifolds for Allis Chalmers "W," "WC," "WA," "WF"
Water Pumps for John Deere Models "G", "A" & "B"

Write Today for Price Lists and Dealer Discounts



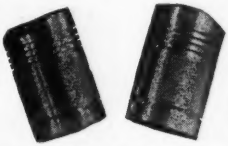
4 CYLINDER MANIFOLDS

JOHNSON MACHINE SHOP

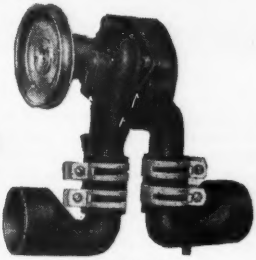
914 East Howard St., Pontiac, Illinois

Southern Distributor: Connally Bearing Co., Amarillo, Tex.

COLD MANIFOLDS



ALUM. DOME-HEAD PISTONS



WATER PUMPS

EATON SERVES THE WEST

BORDER TO BORDER

EATON

The West's Leading Manufacturer & Distributor of LP Gas Equipment

TRUCK TANKS • TRANSPORTS • DOMESTIC SYSTEMS
BULK PLANTS • APPLIANCES • FITTINGS • INDUSTRIAL GAS PLANTS

Write for Catalog

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4800 York Street, Denver, Colorado

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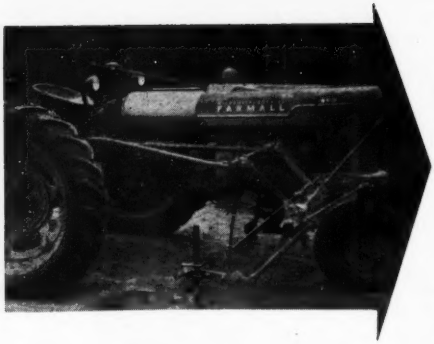

Photo shows a Manchester US-H type tank installed on an International Farmall H tractor. Advantages of this new tank over previous models: Tank has a bracket welded to the front which replaces the existing gas tank bracket. Previously it was necessary to cut off part of the gasoline bracket to install this type of tank—with the new Manchester US-H and US-M tanks you simply remove the gasoline bracket and bolt the L.P. Gas tank in place. All brackets for tractor air cleaner and steeringrod bearing are a part of the L.P. Gas tank itself. This type of tank is available for either the Farmall H or Farmall M tractor. The H tank has 22 gals. and the M has 27 gals. capacity.

All valves are UL approved and conform to all industry standards. Custom designed Manchester tanks with suitable mounting brackets are available for all makes and models of trucks and tractors.

Write for educational brochure covering LPG conversion on automotive equipment and tractors.

Bonded and Approved in States where required.

MANCHESTER
WELDING & FABRICATING CO.
2880 Norton Ave., Lynwood, Cal.
Phones: NE 1-9357 NE 6-2839

PROPANE TRUCK TANKS
FOR ALL DELIVERY NEEDS

In streamline (illustrated) and walkway types, 1,181 gal. to 2,000 gal. water capacities. Constructed in accordance with A. S. M. E. Code, Par. U-69, 1950 edition. Mounted on your chassis complete with valves, fittings, pump, hoses. Unit ready for immediate use when picked up. Write for details.

Also 500 gal. & 1,000 gal. Domestic Tanks (Salem System)

Storage Tanks Up to 6,000 gals.

McNAMAR AND CROWLEY

McNAMAR AND CROWLEY, INC.
SALEM 5, ILLINOIS

New York Association Meeting

An interesting program combining business with pleasure was featured at the June 18 spring meeting of the New York State L.P. Gas Assn. held at the Syracuse Yacht Club. Opening the meeting was Len Ferris, president.

A round table discussion highlighted the business session and included C. A. Baker, director, Weights and Measures bureau, New York state; Donald M. O'Brien, division of safety, New York state; and Roy R. Johnson, vice president, Fuelane Corp., Liberty.

Other speakers on the agenda included Lou Cohen, director, Glo-Gas Corp., Massena, N.Y.; Mel Ennis, training director, National Committee for L.P. Gas Promotion; and Joe Rhode, Hardwick Stove Co., who spoke on "Gas Cookery Still On Top." Boating, golf, swimming, dancing and a Hinerwadel clam bake were entertainment features.

Tennessee Group Sponsors Exhibit

L.P. gas dealers of the mid-South are cooperating with the Tennessee LPGA in sponsoring and promoting an LPG exhibit at the Mid-South Fair Sept. 18-27 in Memphis, Tenn. The Tennessee group is renting and subrenting sections of a 40 ft x 180 ft. tent in the fair grounds.

A "Miss Butane" and "Miss Propane" will register attendants and obtain information as to types of heating, cooking and water heating used. A 10 ft. x 20 ft. painted map showing an area of 150 miles around Memphis will serve as a background to the tent on which LPG dealers will be located, for a fee of $15 required by the exhibit committee headed by J. S. Jones. A list of prospects obtained during the registration will be turned over to participating dealers.

Those wishing to participate in this

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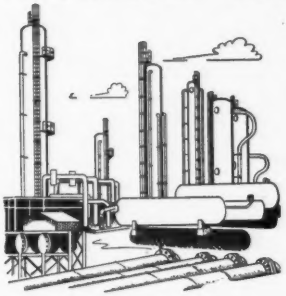

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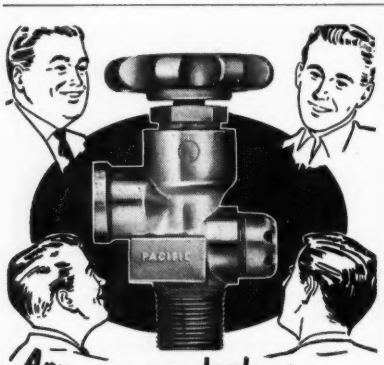
Fair promotion are requested to contact W. G. Petty, P.O. Box 3835, Lamar station, Memphis, Tenn.

A complete report of the Tennessee convention, being held Aug. 4-5 in Nashville will appear in the September issue.

LPGA Appoints Chairman

Four standing committee chairmen and one special committee chairman have been appointed for the coming year by Foster N. Mabee, newly elected LPGA president. Mark Anton, Suburban Propane Gas Corp., Whippany, N.J., was reappointed chairman of the Finance committee. Lee A. Brand, Empire Stove Co., Belleville, Ill., is the new chairman of the Publicity and Advertising committee; George Benz, Phillips Petroleum Co., Bartlesville, Okla., will head the Transportation committee and A. H. Menuet, Skelly Oil Co., Kansas City, Mo., the Technical and Standards committee. Stan Beske, Kay Gases Co., Chicago, is chairman of the Convention committee.

LPGA's West Coast office in San Francisco moved July 1 to Sacramento, Calif. George Requa, executive secretary of the California Liquid Gas Dealers Assn., will be in charge of a joint office for both groups.



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Warren Kraft Is President Of CNGA for 1952-1953

WARREN KRAFT

At the annual meeting of the board of directors July 8, Warren H. Kraft, Honolulu Oil Corp., was installed as president of the California Natural Gasoline Assn. for the fiscal year of 1952-1953.

Fred L. Hartley, Union Oil Co. of California, was elected vice-president and E. R. Millett, Jr., was again appointed secretary-treasurer.

Kansas Group Installs Lee Laptad As President

Lee Laptad, Johnson County L. P. Gas, Olathe, Kan. was installed as president of the Kansas L. P. Gas Assn. due to the recent resignation of Rex Wheeler, formerly of the Humburg Co., Olathe, who has become sales representative of the Kansas and southern Nebraska area of J. B. Beaird Co., Shreveport, La. Mr. Wheeler has also served the associa-

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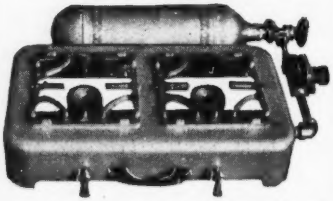

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Your cost $23.70
Retail Price.....$39.50

Cast iron model UY-5, your cost $19.85; retail price $34.50.

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EXTRA PROFIT

FOR BOTH YOU AND YOUR CUSTOMER

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tion as district director and vice president and has contributed much in engineering knowledge to LPGA sponsored schools.

Other new officers are W. B. Hettic, Hettic Gas & Appliances, Inc., Liberal, vice president; Frank Groves, Groves Oil Co., Arkansas City, secretary-treasurer; and Clarence Steckel, Steckel Appliance Co., Russel, district director.

Tank Fabricators Committee Merges With LPGA Section

Plans are completed for the merging of the L. P. gas Tank Fabricators Committee with LPGA's Tank Fabricators Section, Howard D. White, executive vice-president, has announced. Approval of the consolidation was voted June 16 at a meeting in Dallas, Tex., attended by representatives of companies contributing to the support of the committee's work. It will be brought before LPGA's board of directors at its Sept. 11-12 session in Minneapolis.

FRED HENNINGER

The LP-Gas Tank Fabricators Committee was organized last year to provide this branch of the industry with adequate representation in Washington, D.C., for the duration of emergency controls. Members of the group contributed to a special fund, opened a Washington office and employed William H. Brooks to carry on its activities.

At the Dallas meeting, it was agreed that the work should be continued after the emergency as a

permanent program in the interests of "expanding markets, standardization of production, codes and regulations and for the essential purpose of raising the level of safety and prestige in the industry." It was decided that these objectives could best be achieved by merging the committee into LPGA's Tank Fabricators Section, Mr. White states.

Fred A. Henninger, Charlotte Tank Co., Charlotte, N.C., is chairman of the Tank Fabricators Section and of the Tank Fabricators Committee.

New Mexico LPG Short Course Attended by 58 Students

The first annual New Mexico L. P. Gas service school was held July 21-23 at the mechanical engineering building of the University of New Mexico, Albuquerque, with 58 registrants, according to J. C. Crawford, LPGA Mountain States district secretary.

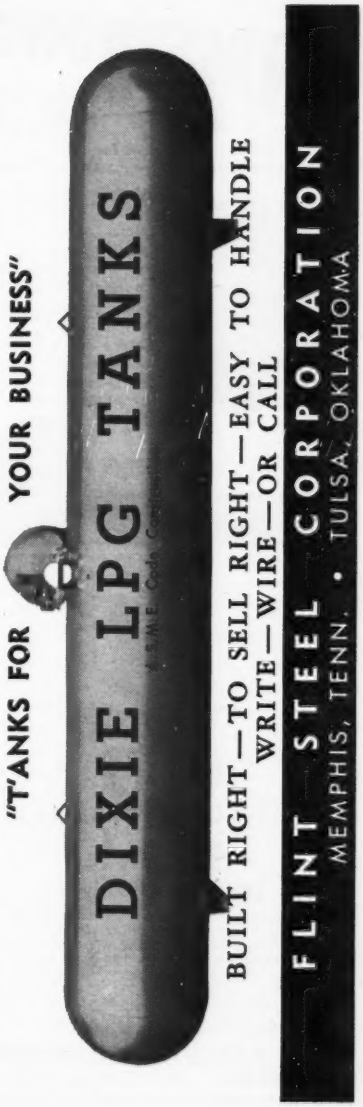
The subjects covered at the short course included: properties and characteristics of L. P. gas, safety, regulators, controls, fire fighting, carburetion, and customer relations.

This was the first service school to be sponsored by the state organization.

Legislative News Correction

Typographical errors produced a misunderstanding with regard to an item published in the April issue of BUTANE-PROPANE *News* concerning the South Carolina L.P. gas safety regulatory law.

Amendments to the law created a three-man L.P. gas board composed of the Insurance Commissioner, a member of the State Firemen's Assn., and a member of the South Carolina



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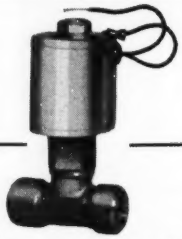

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Available in 6 and 12 volt D.C.

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LPGA. Operating companies must be licensed at a fee of $10 per year plus a $25 license for each branch or sub-dealer, not $10 as indicated in the original story.

MISSISSIPPI

House Bill covering the taxation of petroleum products has been signed by the Governor. However, before passage and approval, it was amended to eliminate the increase in the gallonage tax on liquefied petroleum gas to ¼c per gal. House Bill 590 amending the existing LPG law was also approved.

Big LPG Underground Storage Being Built by Phillips

A 400,000-barrel underground storage cavern for liquefied petroleum gas is now being developed by Phillips Pipe Line Co. near Kankakee, Ill. This is a subsidiary of Phillips Petroleum Co.

More than 80 miners, working in three shifts, are assigned to the project, which will probably be completed by next March. It is being dug in shale from a 294-foot shaft between the 200 and 300 foot levels. Gas will be fed into it by pipe line from the company's plant at Borger, Texas, for later use in the Midcontinent area.

NFPA Issues New 1952 Pamphlet No. 58

A new 1952 edition of the Standards for the installation of containers and pertinent equipment for liquefied petroleum gases, popularly known as Pamphlet 58, has recently been published by the National Fire Protection Assn., incorporating amendments adopted at the NFPA annual meet-

ing in New York, June 9-13, 1952, as recommendation of the NFPA Committee on Gases.

The present 1952 edition is a revision of that issued in 1951 and includes a number of changes in detail to keep the standards up-to-date and covers new developments in the use of propane and butane.

Prior editions of No. 58 have been adopted as law in some 37 states. They have also been adopted and promulgated by the National Board of Fire Underwriters and extensively used for insurance purposes.

The NFPA Committee on Gases, under the chairmanship of H. E. Newell, assistant chief engineer of the National Board of Fire Underwriters, includes a group of technical experts representing various industries, fire marshals and U. S. government, insurance organizations and others.

Heater Codes May Combine To Aid Industry Production

Electric and gas heater codes may be combined into a single code in order that critical materials allotted to the industry might be used for either commodity instead of being limited to the manufacture of one only.

That is the recommendation adopted by the Domestic Water Tank and Water Heater Industry Advisory committee at a recent meeting with the National Production Authority, U. S. Dept. of Commerce in Washington.

Industry members reported they were not having difficulty in procuring their allotments of steel under CMP but pointed out that replacement orders were more important to the industry than new orders, and their greatest difficulty is in getting supplemental allotments.

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Ken Rugh Becomes Phillips' Public Relations Manager

K. W. Rugh, a veteran of 22 years service with the Phillips Petroleum Co., Bartlesville, Okla., has been named manager of the company's public relations.

K. W. RUGH

K. C. Adams, chairman, and Paul Endicott, president of Phillips, said Chester W. Cleveland, who has been director of public relations, has resigned to re-establish his own public relations firm in Chicago. Fred Pralle, who has been Mr. Cleveland's first assistant, will become publicity director, reporting directly to Rugh.

Mr. Rugh has been in the service of Phillips for more than 22 years. During the first 17 years he was engaged in the sales and distribution of liquefied petroleum gases, including managing the Philgas Co., a Phillips subsidiary. He has served as assistant manager of the sales department during the past five years.

F. N. Mabee Sells Denver Firm For Half-Million Dollars

Stock of the Colorado Natural Gas & Fuel Co., of Denver, has been purchased from F. N. Mabee by associates of the investment firm of Peters, Writer & Christensen, Inc., it was announced recently.

Consideration for the stock of the firm, which distributes liquefied petroleum gas and appliances for its use and currently grosses about

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THE PERFECT SEALING COMPOUND

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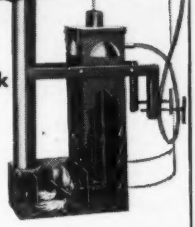

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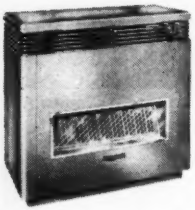

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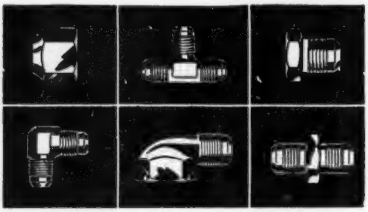

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$1,500,000 a year, was about $500,000.

Walter Davis becomes president of the company and of its subsidiary, Grand-Routt Gas company.

Henry C. Sayers is vice-president and general manager of both firms and Edgar C. Seeman is secretary-treasurer.

Mr. Sayers has been with the Mabee organization since the founding of the firm 15 years ago.

Mr. Seeman has been an accountant with the Texas company here.

Mr. Mabee also operates the Mountain States Gas Co. at Rangely, Colo., and the W. F. Distributing company, Denver. He is also president of the Liquefied Petroleum Gas Assn.

Operate Bulk Stations

Colorado Natural and Grand-Routt operate bulk stations at Denver, Frederick, Otis, Leadville, Dillon, Steamboat Springs and Granby, Colo., for distribution of propane and butane gas.

Southern Service School Attended by 125 LPG Men

The second annual liquefied petroleum gas service school was conducted for leaders and servicemen of the industry at Louisiana State University, Baton Rouge, Aug. 4-6.

The school was sponsored by the LSU General Extension Division and the Department of Industrial Education in cooperation with the Liquefied Petroleum Gas Assn.

J. P. Love, chairman of the seventh district education committee, was general chairman of the service school. More than 125 registered for the course. Outstanding leaders from industry served as instructors of topics pertaining to practical problems.